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# CHINA PROPER

VOLUME I

PHYSICAL GEOGRAPHY, HISTORY  
AND PEOPLES

*July 1944*

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NAVAL INTELLIGENCE DIVISION



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## PREFACE

IN 1915 a Geographical Section was formed in the Naval Intelligence Division of the Admiralty to write Geographical Handbooks on various parts of the world. The purpose of these handbooks was to supply, by scientific research and skilled arrangement, material for the discussion of naval, military, and political problems, as distinct from the examination of the problems themselves. Many distinguished collaborators assisted in their production, and by the end of 1910 upwards of fifty volumes had been produced in Handbook and Manual form, as well as numerous short-term geographical reports. The demand for these books increased rapidly with each new issue, and they acquired a high reputation for accuracy and impartiality. They are now to be found in Service Establishments and Embassies throughout the world, and in the early years after the last war were much used by the League of Nations.

The old Handbooks have been extensively used in the present war, and experience has disclosed both their value and their limitations. On the one hand they have proved, beyond all question, how greatly the work of the fighting services and of Government Departments is facilitated if countries of strategic or political importance are covered by handbooks which deal, in a convenient and easily digested form, with their geography, ethnology, administration, and resources. On the other hand, it has become apparent that something more is needed to meet present-day requirements. The old series does not cover many of the countries closely affected by the present war (e.g. Germany, France, Poland, Spain, Portugal, to name only a few); its books are somewhat uneven in quality, and they are inadequately equipped with maps, diagrams, and photographic illustrations.

The present series of Handbooks, while owing its inspiration largely to the former series, is in no sense an attempt to revise or re-edit that series. It is an entirely new set of books, produced in the Naval Intelligence Division by trained geographers drawn largely from the Universities, and working at sub-centres established at Oxford and Cambridge. The books follow, in general, a uniform scheme, though minor modifications will be found in particular cases; and they are illustrated by numerous maps and photographs.

The purpose of the books is primarily naval. They are designed first to provide, for the use of Commanding Officers, information in a

comprehensive and convenient form about countries which they may be called upon to visit, not only in war but in peace-time ; secondly, to maintain the high standard of education in the Navy and, by supplying officers with material for lectures to naval personnel ashore and afloat, to ensure for all ranks that visits to a new country shall be both interesting and profitable.

Their contents are, however, by no means confined to matters of purely naval interest. For many purposes (e.g. history, administration, resources, communications, etc.) countries must necessarily be treated as a whole, and no attempt is made to limit their treatment exclusively to coastal zones. It is hoped therefore that the Army, the Royal Air Force, and other Government Departments (many of whom have given great assistance in the production of the series) will find these Handbooks even more valuable than their predecessors proved to be both during and after the last war.

J. H. GODFREY

*Director of Naval Intelligence*

1942

The foregoing preface has appeared from the beginning of this series of Geographical Handbooks. It describes so effectively their origin and purpose that I have decided to retain it in its original form.

This volume has been prepared for the Naval Intelligence Division at the Cambridge sub-centre (General Editor, Dr H. C. Darby). It has been written mainly by Professor P. M. Roxby and Mr T. W. Freeman, with contributions from Dr L. Giles, Dr J. L. Maxwell, Mr P. O'Driscoll and Dr W. Simon. The maps and diagrams have been drawn mainly by Miss Margaret Alexander, Mr A. O. Cole, Miss K. S. A. Froggatt, Miss F. Hands and Mrs Gwen Raverat. The volume has been edited by Professor P. M. Roxby.

E. G. N. RUSHBROOKE

*Director of Naval Intelligence*

*July 1944*

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PART ONE  
PHYSICAL GEOGRAPHY

Chapter I  
INTRODUCTION

*Definition : China Proper and Outer China.*

*China Proper.*

*Outer China :* Outer Mongolia ; Tannu Tuva ; Tibet ; Sinkiang.

DEFINITION : CHINA PROPER AND OUTER CHINA

It is by no means easy to define China as a political entity, but it is important to distinguish the status of the different regions which compose that vast country as it appears on a political map of the world. The following account attempts to define the position in 1937 prior to the Japanese invasion of the country.

The distinction between 'China Proper' and what used to be called the Chinese Dependencies or Empire is well known, but the connotation and significance of these terms have considerably changed in recent times. Until the early years of the present century China Proper was essentially China 'within the Great Wall' with its historic 'Eighteen Provinces' (*Shih-pa shêng*). The Dependencies consisted of Manchuria, Mongolia, Tibet and Sinkiang or Chinese Turkestan, although the administration of the last-named was rather in the nature of a compromise between the provincial system and 'colonial' rule, and technically it has long been customary to include it as a province of China (Fig. 1).

This distinction between the 'Eighteen Provinces' and the Dependencies—or Outer China, to use the more usual modern term—was an important one and of long standing, for the course of the Great Wall corresponded closely to the border zone between 'the steppe and the sown', separating the essentially agricultural civilization of China from the predominantly pastoral and mainly non-Chinese peoples of the grasslands outside it. China 'within the Great Wall' was not much more than one-third of the total area of the Empire, but it comprised at least 95% of the entire population.



The contrast in ethnic and social type, however, between the regions separated by the Great Wall was much less pronounced on the Manchurian than on the Mongolian or Tibetan border, for from very early times there had been a Chinese agricultural element in the Liao basin of south Manchuria and, although the Manchu dynasty during the greater part of its regime had severely restricted Chinese immigration into its ancestral territories, it had for political reasons relaxed these restrictions in the later nineteenth century.

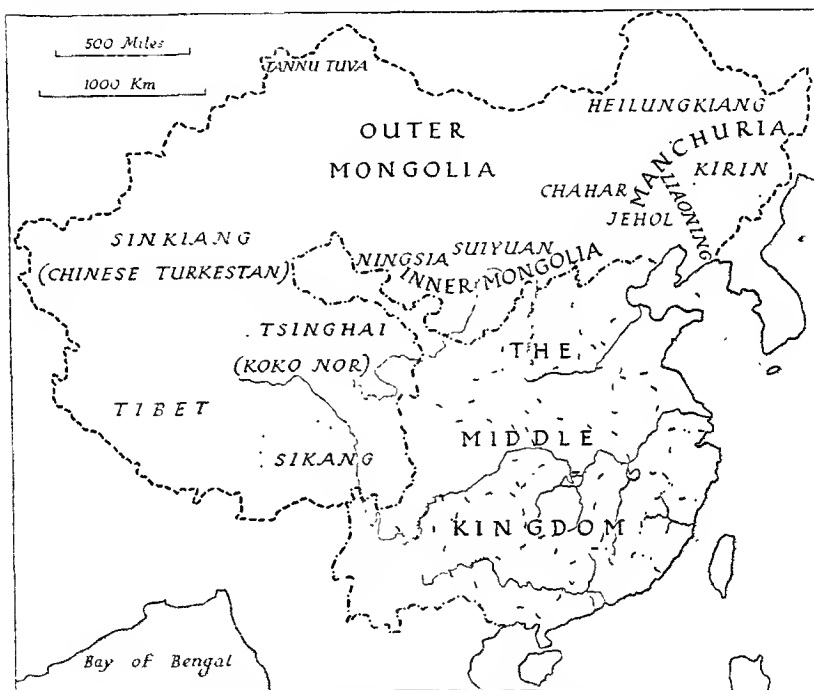


Fig. 1. 'China Proper' and Outer China

Based on *New Atlas of China*, plate 1 (Shanghai, 1934).

The flow of Chinese emigrants northwards into the unoccupied spaces of Manchuria, destined in the 'twenties' of the present century to become a mighty flood, had already begun, and in 1907 (four years before the Revolution which drove the Manchus from the throne, abolished the Imperial regime and substituted the Republic of China) Manchuria was incorporated in China Proper. Its three provinces, however (Heilungkiang, Kirin and Liaoning or Fengtien), were administered as a single viceroyalty, and this

arrangement was virtually continued under the Republic. Manchuria under the famous Chang Tso-lin was practically independent of China. His son and successor, Chang Hsueh-liang, declared his allegiance to the National Government at Nanking, but three years later the Japanese occupation of the country and the establishment of the satellite state of 'Manchukuo' (1932) removed it from Chinese control. Manchukuo, however, has never been recognized by Great Britain, and the Chinese still regard Manchuria as an integral part of their political entity. It is important to note that, whatever its political or legal status, Manchuria is now overwhelmingly Chinese in ethnic type and culture, except on its western border.

After the Revolution of 1911-12 the Republican Government further developed the policy of incorporating within the Chinese provincial system those parts of the Dependencies immediately adjacent to the essential China and likely to become important as outlets for colonization by Chinese peasants. This process was applied to that part of the Mongolian plateau known as Inner Mongolia, which lies on the Chinese side of the Gobi desert and has been described as 'the country of the long grass'. By 1928 four new provinces had been carved out of this territory, these being—from west to east—Ninghsia, Suiyuan, Chahar and Jehol. The last-named province, however, which is drained and orientated towards the Liao basin of south Manchuria, was shortly afterwards transferred to the Manchurian administration and suffered the fate of that country when it was overrun by the Japanese armies in 1931-2; it is now technically a part of Manchukuo.

The Chinese speak of the Manchurian group as the Four North-Eastern Provinces (Heilungkiang, Kirin, Liaoning and Jehol) and of the Inner Mongolian group as the Three North-Western Provinces (Ninghsia, Suiyuan and Chahar). Peasant immigration has now given the Chinese a numerical majority in the latter group, but Inner Mongolia should not be thought of as ethnically and culturally Chinese in the sense that the greater part of Manchuria is. The important question of the relationship of the Chinese cultivators to the Mongol herdsmen, and of the policy of the Chinese Government in this frontier zone, will be discussed at a later stage.

The policy of incorporation within the Chinese provincial system was applied also by the Republican Government to the north-eastern and eastern portions of the great Tibetan plateau adjacent to the old China Proper. Two large provinces were here organized : (a) Tsinghai (Koko nor), which includes the Tsaidam swamp and

the adjacent plateaux, to which were added certain districts detached from north-west Kansu ; and (b) Sikang (Chwanpien), comprising the south-eastern portion of the Tibetan massif together with the western mountainous marches of Szechwan which were detached from that province. These new provinces may be said to include those parts of Tibet which were considered essential to the security and expansion of China and, in particular, to the control of the main trade-routes through the Kansu corridor to Chinese Central Asia (Sinkiang). The ethnic type and culture of the peoples of these provinces are definitely Tibetan, but, as a result of the great western migration set in motion by the Japanese invasion of the eastern seaboard, Chinese infiltration into the valleys of Sikang has been stimulated (see p. 85).

### CHINA PROPER

'China Proper', therefore, if taken to mean the area provincially organized and subject to the direct control of the Central Government, has been extended in the course of the present century beyond the limits of the Great Wall and the eastern edge of the Tibetan plateau which were its historic boundaries. The table on p. 6 shows its content. Manchuria, which has been beyond Chinese control since 1931-2, is excluded and so is Sinkiang, because for all practical purposes it is part of Outer China although technically reckoned a Chinese province (Fig. 2).

It is important to realize the truly continental proportions of China. Excluding the great interior province of Sinkiang or Chinese Turkestan, which, as already indicated, is in fact semi-colonial, China Proper is comparable in size to Europe without Russia. It is its provinces which correspond in area to the individual *countries* of Europe. Of the twenty-three (again excluding Sinkiang) which compose it, only two are smaller than England and nine are larger than Great Britain. The smallest of all (Chekiang) is a good deal more than twice the size of Denmark, and Szechwan, the largest of the historic provinces, in spite of its loss of territory to the newly-formed province of Sikang, is approximately the size of Sweden. It is instructive also to compare the distances which separate the great regional centres of China with those separating widely removed capitals of European countries. The distance of Peiping (Peking) from Canton corresponds closely to that of Stockholm from Rome. Shanghai is much farther from Chêngtu

and Chungking, the regional centres of west China, than London is from Warsaw ; indeed the Yangtze route (the main artery of communications) from Shanghai to Chungking approximates to the distance by rail between London and Moscow. Hankow,

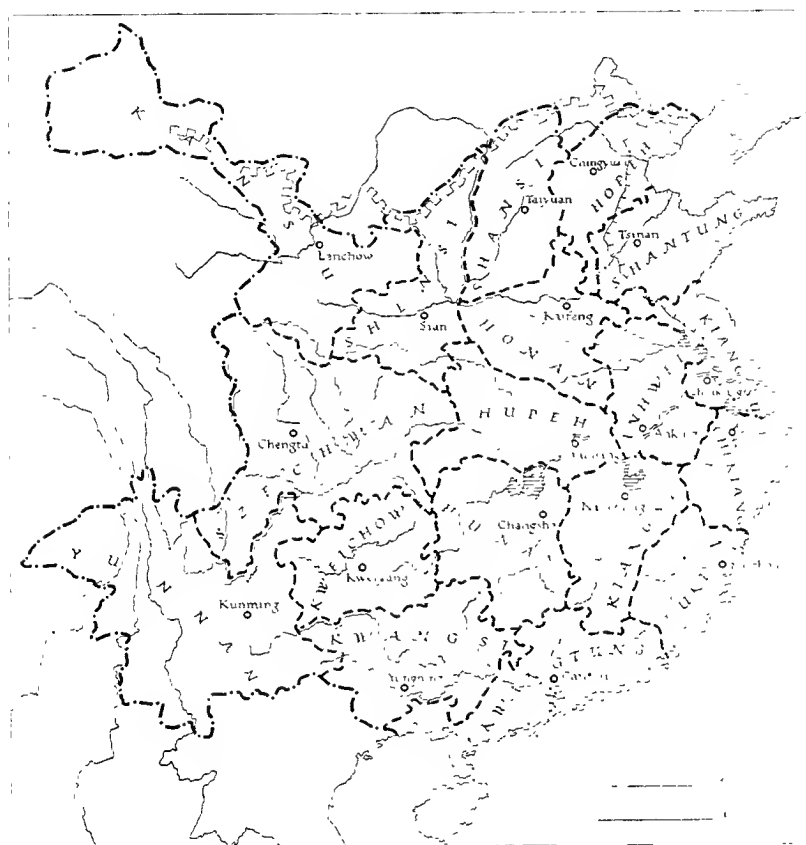


Fig. 2. Administrative divisions of 'China Proper'

Based on *New China Map* (Shanghai, 1938).

The capital city of each province is shown.

in the heart of China Proper, has distance relationships with the marginal cities of Peiping, Shanghai, Canton and Chêngtu comparable to those of Berlin with Stockholm, London, Rome and Moscow.

*Administrative divisions of China*

Province	Capital		Area in sq. miles	Population	Density per sq. mile
	Official form	Alternative form			
'China Proper'					
Anhwei	Hwaining	Anking	51,888	23,265,368	402
Chekiang	Hangchow	Hangchow	39,780	21,230,749	534
Fukien	Minhow	Foochow	62,259	11,755,625	192
Honan	Kaifêng	Kaifêng	66,676	34,289,848	514
Hopeh	Chinyuang	Paoting	59,341	28,644,437	483
Hunan	Changsha	Changsha	105,467	28,293,735	268
Hupei	Wuchang	Wuchang	80,169	25,541,636	318
Kansu	Lanchow	Lanchow	145,930	6,705,441	46
Kiangsi	Nanchang	Nanchang	77,281	15,820,403	205
Kiangsu	Chinkiang	Chinkiang	41,818	36,469,321	872
Kwangsi	Yungning	Nanning	83,985	13,385,215	159
Kwangtung	Kwangchow	Canton	83,918	32,289,805	385
Kweichow	Kweiyang	Kweiyang	69,278	9,043,207	130
Shansi	Yangku	Taiyuan	60,491	11,601,026	192
Shantung	Tsinan	Tsinan	69,198	38,029,294	549
Shensi	Changan	Sian	72,334	9,717,881	135
Szechwan	Chêngtu	Chêngtu	166,485	52,963,269	318
Yunnan	Kunming	Yunnan(fu)	123,539	11,994,549	97
			1,458,847	411,040,814	282
The New Provinces					
Chahar	Wanchuan	Kalgan	107,677	2,035,957	19
Ninghsia	Ninghsia	Ninghsia	106,115	1,023,143	10
Sikang	Paan	Batang	143,457	968,187	7
Suiyuan	Kweisui	Kweisui	112,493	2,083,269	18
Tsinghai	Sining	Sining	269,117	1,196,054	4
Manchuria					
Heilungkiang	Lungkiang	Tsitsihar	174,544	3,672,777	21
Jehol	Chengteh	Jehol	74,278	2,054,305	28
Kirin	Yungki	Kirin	109,384	7,135,542	65
Liaoning	Shenyang	Mukden	124,224	16,465,303	132
Outer Mongolia (including Tanmu Tuva)					
	Urga	Ulan Bator	625,783	2,077,669	3
Sinkiang	Tihwa	Urumtsi	705,769	4,360,020	6
Tibet	Lhasa	Lhasa	469,294	3,722,011	8

Source: Estimate of the Chinese Ministry of the Interior as in *The Statesman's Year-Book* (London, 1943).

## OUTER CHINA

It remains briefly to summarize the position of Outer China. This consists in theory of Outer Mongolia and the adjacent but now distinct unit of Tannu Tuva, Tibet and, with the technical qualification already explained, Sinkiang or Chinese Turkestan. In fact, it is only in the case of the last that China's sovereignty and control are more than nominal. The inclusion of these outer territories was mainly the work of the Manchu dynasty, under which in the eighteenth century the Chinese Empire reached its maximum extension (Fig. 117).

The authority of the preceding native Ming dynasty (1368-1644) did not extend to the north-west beyond the Gobi desert or to the west beyond the threshold of the Tarim basin about Hami and the Koko nor region in the extreme north-east of Tibet. The Manchus brought the tribes of Outer Mongolia under control at the end of the seventeenth century, made Tibet a political appendage of China in 1720, and incorporated Chinese Turkestan and Dzungaria as Sinkiang or the New Dominion in the middle of the eighteenth century. It was these newly acquired and loosely held dependencies, the farthest removed from the essential China, which tended to break away when the Manchu dynasty fell and the Chinese Republic came into existence (1911-12). The Tibetans and the Mongols of Outer Mongolia, who of all the non-Chinese peoples included within the old Empire have the strongest sense of what we call nationality, took advantage of the confused situation in China to assert their independence.

*(a) Outer Mongolia*

Outer Mongolia lies on the farther side of the broad Gobi desert which, itself virtually uninhabited, has effectively separated its tribes from those of Inner Mongolia adjacent to China. Geographically, Outer Mongolia 'turns its back' on the real China. This steppe-desert area increases in fertility northwards towards the forest border where it makes contact with Russia, and economically it is orientated towards the Trans-Siberian railway. These circumstances have profoundly influenced its recent history. Czarist Russia supported the revolt of Outer Mongolia in 1912, and helped it to secure virtual independence, although under the nominal sovereignty of China.

After the Russian Revolution of 1917, Outer Mongolia was the scene of conflict between 'red' and 'anti-red' factions, the latter, which represented in the main the noble and priestly classes, tending to seek support from Japanese imperialism. Ultimately Soviet influence became paramount, and the Mongol Peoples' Republic, which came into existence in 1924, was organized on Soviet lines and is effectively controlled by Soviet agencies. At the same time the Sino-Soviet Treaty of 1924 recognized that 'Outer Mongolia is an integral part of the Republic of China', and the Soviet Government undertook 'to respect China's sovereignty therein'. The status of Outer Mongolia has not materially changed since that date.

(b) *Tannu Tuva*

This is now the political name of the district formerly known as Urianghai. It lies to the north-west of Outer Mongolia and, under the Manchu dynasty, was considered a part of it. It is situated, however, in the mountainous forested region of Central Asia, as distinct from the steppe zone, and the predominant element in its small population—the Tuvian—is not Mongol but Turkish. Partly for this reason and partly because Russian colonists, attracted by its very considerable resources, had been entering it for some years, both the Czarist Government in 1911-12 (when Outer Mongolia was breaking away from China) and later the Soviet Government (when the Mongol Peoples' Republic was formed) were anxious that it should have a distinct political existence. Hence its separation from Outer Mongolia and its present status as the Tuvian Peoples' Republic under Soviet protection. Its position *vis-à-vis* China is analogous to that of Outer Mongolia, but the theoretical sovereignty of China is less definitely affirmed.

(c) *Tibet*

In Tibet, as used in a broad geographical sense, there is the same contrast as in Mongolia between an inner region, adjacent to the essential China and susceptible of control, and an outer region, far more remote and better placed for asserting its independence. The policy of the Chinese Republic of incorporating what may be called 'Inner Tibet' in China Proper by forming the two new and vast provinces of Tsinghai and Sikang has already been described.

The region in Tibet corresponding to Outer Mongolia is the Lhasa kingdom or state over which the Dalai Lama presides. This extends from the eastern borders of Tsinghai and Sikang to Kashmir and the Pamir region in the west, and is approximately limited on the north by the Kun lun mountains where it marches with Chinese Turkestan (Sinkiang), and on the south by the Himalayas, where it is bordered by Bhutan, Sikkim, Nepal and British India. Chinese overlordship of Tibet was established in the early eighteenth century by the strong Manchu regime of that period, largely because of the intimate connections between Tibetan and Mongol Buddhism, which had strong political implications and made it desirable for China to control the ecclesiastical organization at Lhasa. This control was, however, much weakened and increasingly disputed during the decline of the Manchu dynasty in the nineteenth and early twentieth centuries, and the position was further complicated by the fact that Tibet had become a zone of conflict between the aims of Russian imperialism and the security and interests of British India.

The fall of the Manchus in the Chinese Revolution of 1911-12 was immediately followed by a Tibetan revolt and assertion of independence, closely corresponding to, and contemporary with, the revolt in Outer Mongolia. The Russian support of the latter movement had its analogy in the protection given to the Dalai Lama by the Government of British India and the extension of its sphere of influence to Tibet. Since that time the exact status and boundaries of Tibet Proper or the Lhasa kingdom have been the subject of protracted Anglo-Sino-Tibetan negotiations. China has not relinquished her sovereignty but Tibet is virtually an independent state. The position is strictly comparable to that in Outer Mongolia. In recent years, however, more friendly diplomatic relations have been re-established between the Chinese Government and Lhasa, and the immediately practical questions concern the boundaries of the new Chinese provinces carved out of eastern Tibet and the policy of the Chinese Government towards Tibetan subjects in the borderland zone.

(d) *Sinkiang (Chinese Turkestan)*

Sinkiang is the most significant part of Outer China, and the fact that it has for so long been technically a 'province', as distinct from a 'dependency', of China indicates the degree of importance attached to it. The core of Sinkiang is the great Tarim basin, the



remarkable depression between the northern flanking ranges (Altyn tagh and Nan shan) of the huge Tibetan plateaux to the south and the lofty Tien shan range to the north. The centre of the Tarim basin is occupied by the waterless desert of Takla Makan—virtually a westward extension of the Gobi—but on either side, immediately beneath the mountain ranges, which supply water to the streams that soon lose themselves in the desert, ribbons of fertile oases determine the historic routes linking China with Central and West Asia. The two ribbons converge westwards at Kashgar, the gate-city for caravan routes through the Pamir passes to western (now Russian) Turkestan and south-western Asia.

China has had a vital interest in this great corridor region of Central Asia ever since she became a consolidated and centralized Empire under the Ch'in and Han dynasties two thousand years ago. Famous expeditions under the Han dynasty in the second century before Christ first brought the 'western region' under imperial rule, and from that time onwards its control has been a main objective of Chinese foreign policy. It was held under the stronger dynasties such as the Han and the T'ang, but lost during long periods of weakness when Tartar hordes pressed inwards on China Proper. The native Ming dynasty, which freed China from Mongol domination in the fourteenth century, did not succeed in pushing its authority beyond Hami and the Kansu corridor. It was left to the vigorous emperors of the early Manchu dynasty to reconquer this key region of Central Asia and incorporate it as an integral part of the Chinese Empire. The province of Sinkiang ('The New Dominion'), as constituted in 1760, comprises more than the Tarim basin and the bordering trade-routes described above. It also includes Dzungaria, which occupies a wide zone of relative depression (the Dzungarian gate) between the Tien shan and Altai mountains and links the Mongolian grasslands with the fertile steppes round Lake Baikal. The oasis route on the northern border of the Tien shan is hardly less important than those within the Tarim basin. In spite of its large proportion of desert, Sinkiang has very considerable resources and potentialities for settlement, but its supreme significance for China lies in the vital trade-routes which it controls.

The scattered peoples of this vast territory, bigger than Manchuria and at least six times the size of Great Britain, do not belong to one dominant national type as in Outer Mongolia and Tibet. They include many Turki tribes, Chinese Moslems (Tungans) and some

Mongols. The prevailing Moslem culture does not seem likely to give political cohesion to the different ethnic groups, although China has had to face more than one formidable Mohammedan rising.

The geographical situation of Sinkiang, more particularly since the construction of the Turksib railway, which runs close to its western frontier, has given Russia a great advantage for exploiting its trade, but, in contrast to its policy towards Outer Mongolia, the Soviet Government has here assisted rather than hindered China in asserting her authority. The chief external menace, as in Inner Mongolia, has come in recent years from Japanese imperialism. On a broad view, Sinkiang is not only far more vital to China than Tibet or Outer Mongolia but it is that part of her former empire which she is most likely to consolidate and integrate when she emerges successfully from her present conflict with Japan.

## Chapter II

### GENERAL PHYSICAL DESCRIPTION

*Geographical Position and Setting* : The China Seas.

*Structure and Relief* : Western Highlands, Eastern Uplands and Interior Lowlands ; Transverse Fold Zones ; Summary of Structural Features ; Trend-lines.

*River Drainage* : The Drainage Pattern ; The Hwang ho ; The Yangtze kiang ; The Si kiang ; The Drainage of the South-Eastern Uplands.

*The Major Regions of China Proper.*

*Bibliographical Note.*

#### GEOGRAPHICAL POSITION AND SETTING

China Proper is itself a sub-continent. It extends from north of latitude  $40^{\circ}\text{N}$  along the line of the Great Wall, where it approaches the sea at Shanhaikwan, to latitude  $18^{\circ}\text{N}$  in the south of Hainan Island, and from longitude  $122^{\circ}\text{E}$  at the eastern extremity of the Shantung peninsula to longitude  $93^{\circ}\text{E}$  at the western end of Kansu province.

Nearly as large as Europe without Russia, it is almost equally complex and diversified in its structure, relief, trend-lines and land-forms. However, it differs radically from Europe in its relations to the sea. Europe projects as a great peninsula into the Atlantic between two marginal systems of seas—the Mediterranean and the Baltic—which have profoundly influenced its development. China presents a huge convex salient to the seas separating it from the island festoons which front the true Pacific. Notwithstanding the broken character of the littoral south of the Yangtze delta, the ratio of coastline to total area is small. The Shantung peninsula in the north and the peninsula which thrusts towards Hainan island from the south coast of Kwangtung are the only prominent projections and, apart from the land-locked Gulf of Pohai and, on a smaller scale, the Bay of Hangchow, the sea nowhere penetrates at all deeply into the interior. China is essentially continental. Canton and other ports on the articulated coast of the south-eastern provinces have had important external contacts from very early times, but this truly maritime fringe is screened from the interior by formidable forested mountain ranges with few and difficult passes. For the country as a whole, until quite recent centuries, the sea was as much a barrier as the great mountains and wide deserts along its western and northern borders. Between them,

they caused the pronounced isolation that accounts for so many of the distinctive features of the historic civilization of the Middle Kingdom.

China Proper is a country of extremely diversified relief. In the North China Plain it contains one vast alluvial lowland with an area considerably larger than that of Great Britain, and the Yangtze links together a number of great basins, although the largest of them—the Red Basin of Szechwan—is an upland basin of considerable elevation and varied topography. Much the greater part of the south, the south-west and the north-west, however, is mountainous or very hilly, and the mean elevation above sea-level of the country as a whole has been estimated at about 1,500 ft. The intense concentration of agriculture and population into basins and plains, occupying rather less than one-fifth of the entire area, is one of the outstanding features of the human geography. Seen on a map of Asia, China appears as a densely-peopled fringe; with south-east Asia and India it is a part of the monsoonal margin of the continent. Its productivity is due to its favourable climate, but this is restricted in area by high mountains to the west and deserts to the north.

The Middle Kingdom, in the historic sense of China 'within the Great Wall', has, on the whole, a very clearly defined natural setting. Through nearly the whole of its great extent from north to south of more than 1,200 miles it is backed and delimited by the vast and lofty Tibetan plateau, the 'Roof of the World', with an average elevation of more than 10,000 ft. The flanking ranges which buttress this gigantic tableland on the Chinese border reach much greater elevations. The snow-clad mountains of the Szechwanese Alps, as seen from the Chêngtu Plain in the far west of China Proper, culminate in peaks of more than 15,000 ft. The north-south trend of these border mountains is continued southwards into western Yunnan, and thence the ranges, lower, but still very formidable, splay out into a series of arcs through Indo-China. Thus China is separated from India by one of the most difficult mountain barriers in the world, a fact which helps to explain the profound contrasts and relatively slight contacts between the historic civilizations of these two great countries. From most of Indo-China there is no such sharp separation, and the characteristic physical features of Yunnan in south-west China are continued into the Shan States of northern Burma.

To the north of Szechwan the transverse ranges of the Kun lun mountains in north-central Tibet are continued eastwards into the

heart of China under the name of the Tsinling shan, constituting, as will be shown later, one of the major topographical features and divides of the country. Great flanking ranges again appear to the north of this zone and sharply delimit the Tibetan plateau from China Proper. The chains of the Nan shan, which buttress Tibet on its north-eastern side, are aligned from north-west to south-east and tower above the Kansu corridor, which gives access from China to Central Asia north of the great Tibetan barrier.

The belt, some 800 miles in extent, from the Nan shan to the Gulf of Pohai, between China Proper and Mongolia, has a very different character from that of the western or Sino-Tibetan borderland. It consists of a series of sharp ridges which delimit the basin-shaped Mongolian plateau and interpose a belt of complex hilly country between the alluvial plain of North China and the relatively level tableland of Mongolia itself. It is this hilly zone on the Mongolian border which is followed by the ancient defences of the Great Wall, spanning the wide gap between Tibet and the sea where China was most exposed to attack from the interior grasslands.

Both the Tibetan barrier on the west and the high edge of Mongolia on the north-west and north, mark the effective limits of the fertilizing monsoon rains that have made possible the rise and intensive development of Chinese agriculture. It is as a frontier zone separating two entirely different types of society that these two boundaries of China Proper have their greatest significance. In general, the contrast is profound in almost every aspect of physical and human geography between the great monsoonal river basins of China Proper and the lofty mountain ranges, high plateaux and arid intermont depressions of Outer China.

To describe in broad terms the architectural ground-plan of China Proper and the relationship of the different structural elements which, in conjunction with erosion, have determined its relief, it is necessary to view the country in a wider setting. On the landward side Manchuria and Central Asia must come into the picture to a certain extent, and it is important to note that the shallow seas separating China Proper from the Liaotung peninsula of Manchuria, from Korea and from southern Japan—the Gulf of Pohai, the Yellow sea or Hwang hai and the East China sea or Tung hai—are only slightly submerged portions of the continental shelf of Asia. The true termination of some of the structural features of China and of the Asiatic continent is to be found in the Japanese archipelago.

*The China Seas*

The coasts of China are described in Chapter VI, in which it will be seen that the apparent simplicity of the coastline is deceptive. Shantung and the south-east coastal fringe, from Hangchow wan to the Si kiang delta, have rocky coasts with varied features and mark the seaward end of upland regions. On the other hand the coasts from Hangchow to Shantung and those bordering the Gulf of Pohai are low-lying and in many places artificially embanked against the sea. The alluvial deposits brought down by the rivers, especially the Hwang ho and the Yangtze, are laid down in shallow seas, and the land is gaining at the expense of the sea. The sea water is visibly impregnated with mud for several miles from the coast in the Gulf of Pohai, and also to the east of the Yangtze.

Although there are widespread divergencies of coastal type, the sea floor is fairly constant in form, and the section drawn from A to B in Fig. 3 shows the major features of the China seas. There is a wide continental shelf, sloping down steadily to 200 m. (700 ft.). This is a former edge of the continent and its margin runs from Korea to Formosa and Hainan. On the outer side of this continental edge there is a sharp descent to the ocean depths, interrupted, however, by a ridge which extends from Formosa to Japan and carries various groups of islands, notably the Luchu or Ryukyu group. These islands are the submerged fragments of a line of folding which extends from north-east Asia through Japan to the East Indies. An area of relatively recent earth movement, it is still subject to earthquakes and volcanic activity. Indeed it forms part of the 'Pacific girdle of fire'. China itself is by no means immune from earthquakes but actual volcanic activity has long since ceased.

The descent to the ocean floor from this ridge is sharp and dramatic. The Ryukyu deep falls to 24,500 ft., which is not the greatest depth known, but is well below the general level of the ocean floor. The general rolling form of the Pacific Ocean bed may be seen in Fig. 4.

## STRUCTURE AND RELIEF

*Western Highlands, Eastern Uplands and Interior Lowlands*

On a broad view, China descends eastwards from the high interior Asia of Tibet and Mongolia by a series of terraces and steps, and the west as a whole is much higher than the east. The west-east

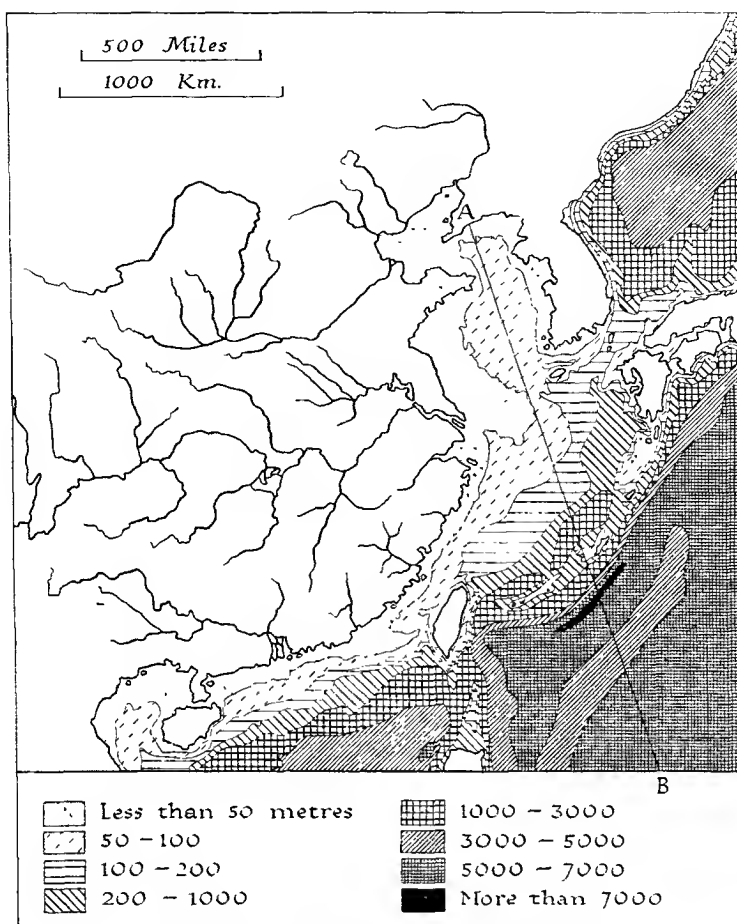


Fig. 3. China and the surrounding seas

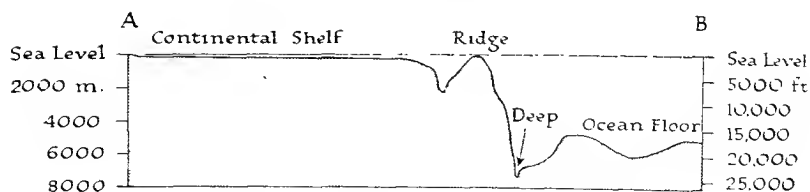
Based on *New Atlas of China*, plate 2 (Shanghai, 1934).

Fig. 4. Section drawn from A to B on Fig. 3

Note the continental shelf in the Gulf of Pohai and the Yellow sea, the ridge carrying a line of islands between Japan and Formosa, and the Pacific Ocean floor. Vertical exaggeration seventy-five times approximately.

lines of the three master rivers—Hwang ho, Yangtze and Si kiang—reflect this general slope, and their drainage basins form the basis of most regional descriptions of the country.

The lofty highlands of the west are, however, relatively recent in the geological sense. The oldest land-masses occur in the east and now appear as worn-down uplands and hill ranges of moderate

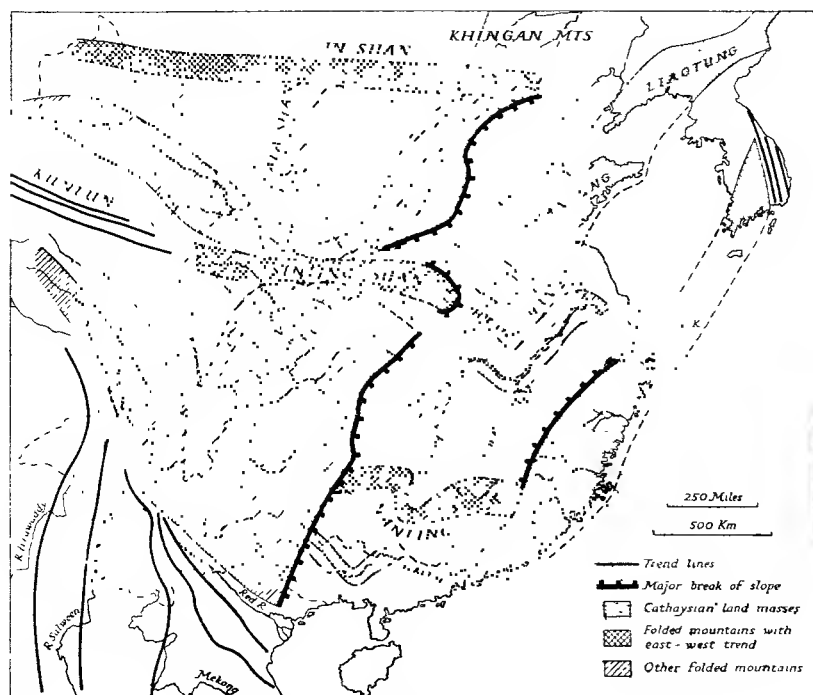


Fig. 5. Major structural divisions

Based on Lee, J. S., *The Geology of China*, Fig. 66 (London, 1939).

elevation. These are seen in the ancient massifs of Shantung, Liaotung, east Manchuria and Korea and in the ranges (mainly composed of crystalline and granitic rocks) of the maritime provinces south of the Yangtze. They are believed to be remnants of an ancient continent (called by geologists 'Cathaysia') which once extended far to the east and occupied much of the area between the present China and Japan, now covered by the shallow seas mentioned above.



One of the most remarkable features of the physical history has been the persistence of a great central trough or series of depressions elongated from north-east to south-west between the western highlands and the remnants of the old Cathaysian continent on the east. In China Proper it is seen in the Gulf of Pohai and the great plain of the north. The continuity of this belt is then interrupted by the range of the Hwaiyang shan, which belongs to the series of west-east fold zones to be presently discussed. Immediately to the south of this range it is resumed in the great Central Basin of the Yangtze round Hankow, and this in its turn is continued far into the heart of south-central China by the wide valleys of the Siang in Hunan and the Kan in Kiangsi province, which have always provided the great corridor routes connecting Central and South China. While all South China is hilly, the south-central portion is relatively depressed in comparison with the south-west and the south-east.

Thus the first important element in the structural ground-plan of China Proper and Manchuria is a *longitudinal* pattern of two highland belts (of which the eastern is a discontinuous group of ancient massifs), separated by a succession of lowland troughs, the general alignment being from north-east to south-west.

### *Transverse Fold Zones*

Equally fundamental in determining the structural architecture of China is a group of transverse (west-east) fold zones which divide East Asia into clearly marked *latitudinal* segments. These west-east fold-zones are the continuation into China of axial ranges which traverse Tibet and its borders and probably have their real termination in Japan. The crucial zones affecting China Proper are the In shan, the Tsinling and the Nanling (Fig. 5).

*The Tsinling shan.*—Of these three the Tsinling forms the most impressive and decisive divide in all China. A broad and lofty mountain belt, it prolongs the axis of the Kun lun mountains of north-central Tibet far eastwards into the very heart of China. It enters the country on the borders of Kansu province and trends nearly due east into the middle of Honan province. With a mean and very constant altitude of more than 8,000 feet and over a hundred miles in width, it forms a real barrier between north and south in the entire western half of China. It is the greatest climatic and vegetational divide in the country, and the strong contrasts between the appearance of the landscape and modes of life on its northern and southern flanks has been the subject of frequent

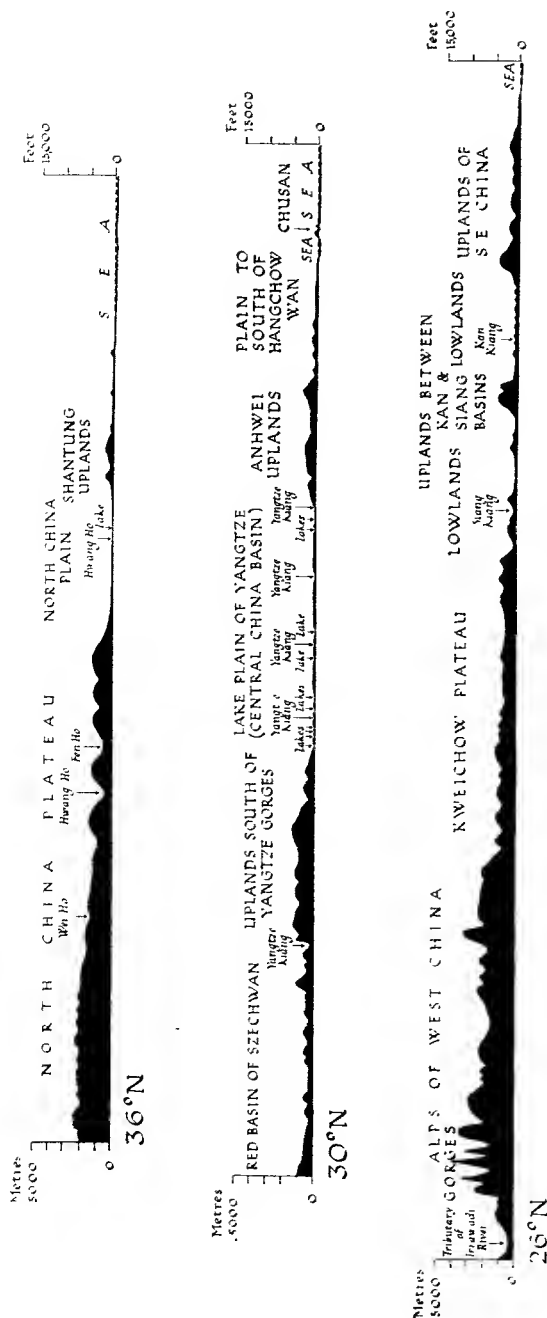


Fig. 6. Sections from west to east along lines of latitude  
Based on *Bathymographical Map of China* (Shanghai and Chungking, 1939).  
Vertical exaggeration approximately thirty times.

comment by travellers from the time of Marco Polo onwards. On the northern side the Tsinling shan presents a tremendous wall to the deep valley-trench (occupied by the Wei ho and a famous section of the Hwang ho or Yellow river) which leads from the plain of North China up to the Kansu corridor and so to Central Asia. Closely related and subordinate to the Tsinling is the *Tapa shan*, which diverges from it in the west near the Tibetan border, trends east-south-east and forms the northern wall of the Red Basin of Szechwan. Thus this fertile province, the heart of West China, is separated from the north-west by the double barrier of the Tapa shan and Tsinling. The two great ranges may be considered as a single mountain complex—'The Central Mountain Belt', as it will be called in the ensuing regional description of China—dividing the country into two major and sharply contrasted regions, the North and the South.

This generalization, however, must be qualified in the case of eastern China. A very significant change occurs as the belt approaches the great longitudinal trough already described. The axis of the Tapa shan is abruptly truncated in front of the Central Basin of the Yangtze, where the river emerges from the famous gorges through which it escapes from the Red Basin of Szechwan. To the north, the axis of the central Tsinling is continued by the Funiu shan a little further to the east, but then suffers a marked displacement. It is bent towards the south-east in the Hwaiyang shan at the eastern end of the Funiu shan, where an important gap (the gate of Hsiangyang) occurs. The Hwaiyang shan, relatively easy to cross but still important as a climatic and vegetational divide, separates the great northern plain from the central Yangtze basin. This range finally subsides into low hills which die out eastwards, so that in the coastal province of Kiangsu the northern plain merges into the deltaic area of the Yangtze without any intervening mountain barrier.

*The Nanling.*—Next in importance as a west-east mountain zone is the Nanling Belt, dividing Central from South China about latitudes  $25^{\circ}$  and  $26^{\circ}$  N. Eastwards from the high tableland of south-west China the Nanling, as a sinuous belt of very hilly country, forms the divide between the Yangtze and the Si kiang, the main river artery of South China, and finally merges with the coast-ranges of the south-eastern provinces with their pronounced south-west to north-east Cathaysian trend. This continuous mountain-rampart from the south-western plateaux to the borders

of Hangchow wan just south of the Yangtze mouth, where the coastal ranges terminate in the Chusan archipelago, has played a decisive role in the history of China. It defines the only section of the country that has virtually tropical conditions all the year round and whose peoples have had maritime interests and foreign contacts from ancient times.

The lowest part of the divide is significantly in the eastern part of the Nanling proper at the head of the great rivers (the Kan and Siang) flowing to the Central Basin of the Yangtze through the relatively depressed zone of south-central China, which continues the great longitudinal trough already described. In this section of the Nanling the historic passes of the Meiling and the Cheling, linking Canton with the corridors through Kiangsi and Hunan, have been from remote antiquity the routes of armies and of commerce.

*The In shan.*—The third of the west-east fold zones occurs about the same distance to the north of the Central Mountain Belt of the Tsinling as the Nanling does to the south. It is known under a variety of names but is usually described as the 'In shan', after the parallel mountain ranges which clearly define the course of the Yellow river from west to east in the northern arm of its famous 'loop' round the Ordos plateau in Mongolia. Further to the east, at the northern apex of the North China Plain, the west-east chains merge with the sharp flexures of the north-western uplands of China Proper and are deflected to their characteristic north-east or Cathaysian trend, this being analogous to the relationship of the Nanling with the coastal ranges of south-east China previously described. These sharp border chains, separating the plain of North China from the Mongolian plateau and followed by the Great Wall in the most critical section of its course, are known as the 'Peking Grid', which aptly describes their pattern. The general west-east alignment is resumed, however, in the mountains of southern Jehol, which intervene between the North China and Manchurian plains, and which confine communications to a narrow coastal sill along the northern borders of the Gulf of Pohai. The seaward termination of the Great Wall at Shanhaikwan ('gate 'twixt mountain and sea') is at the point where the hills come nearest to the coast. Thus the In shan zone may be said to define the northern border of China Proper as against Manchuria and the adjacent part of Mongolia.

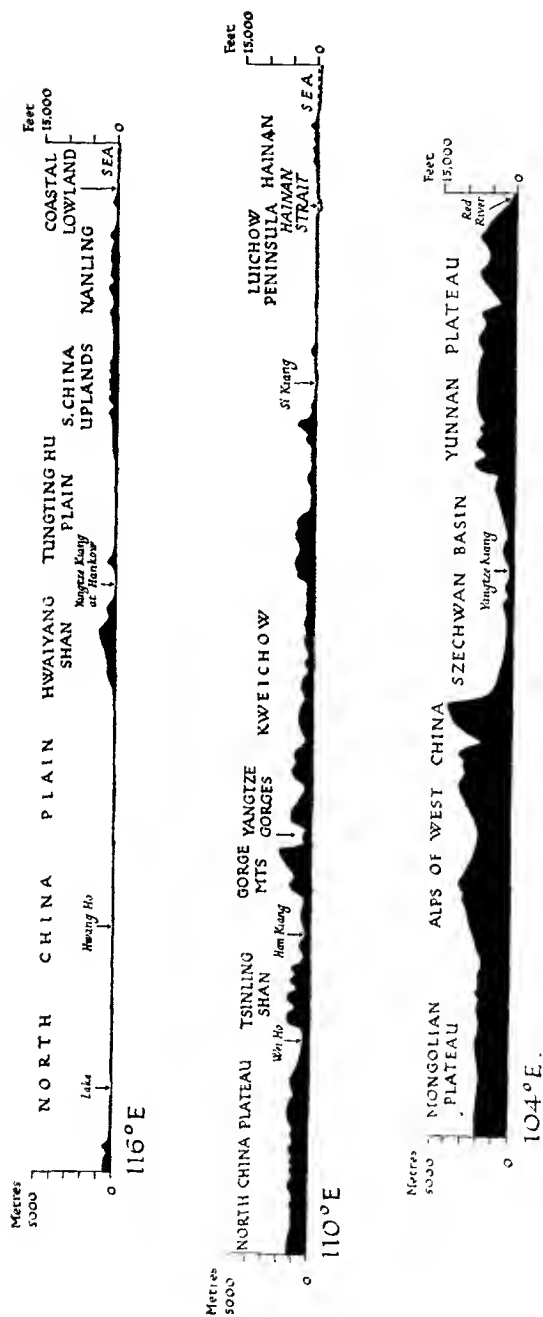


Fig. 7. Sections from north to south along lines of longitude  
Based on *Bathymorphological Map of China* (Shanghai and Chungking, 1939).  
Vertical exaggeration approximately thirty times.

### *Summary of Structural Features*

The intersection of these longitudinal and latitudinal zones divides China Proper into clearly-defined segments or compartments and determines the framework of its chief physiographic regions. Of the two groups the latitudinal has the greater geographical significance, since it forms the chief climatic and vegetational divides of the country and also defines the major basins of the river-drainage. The central sector between the Tsinling and Nanling is the almost exclusive domain of the Yangtze, the Hwang ho is the master stream of the northern sector between the Tsinling and In shan zones and the Si kiang of the sector south of the Nanling.

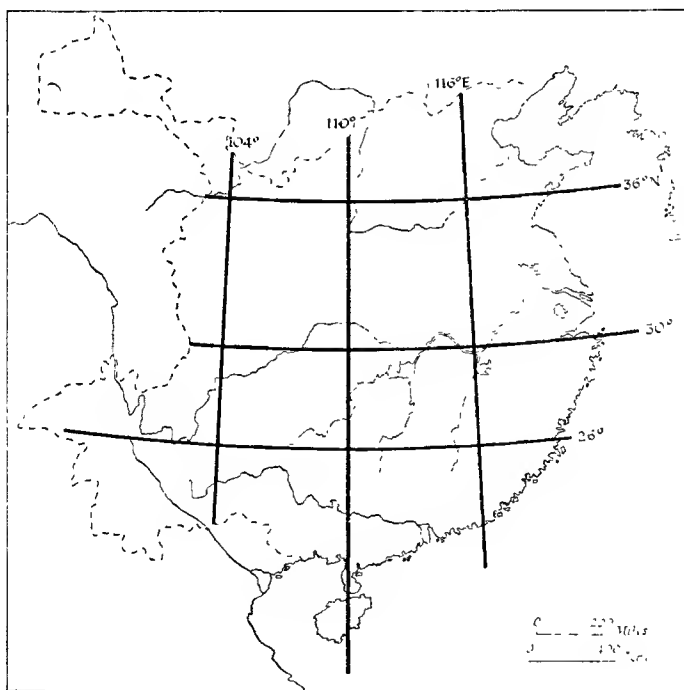


Fig. 8. Lines of section in Figs. 6 and 7

The Tsinling belt has great significance apart from its importance as a barrier and a climatic divide. It has been an extremely persistent fulcrum, dividing China into two halves with different physical histories and corresponding differences of landforms and structure. China north of the Tsinling became a continental area by the end of Palæozoic times. The old and hard

rocks of which it is mainly composed resisted subsequent folding but yielded to earth stresses by large-scale fracturing and foundering, often accompanied by pronounced volcanic activity. Hence the characteristic features are tabular plateaux with tremendous fault-scarps such as that of the Taihang shan, which abruptly delimits the north-western plateau block from the North China Plain and forms the impressive mountain wall to the west of the trunk railway from Peiping to Hankow. The deep east-west trench at the northern foot of the Tsinling, caused by faults of enormous extent, has already been noticed.

China south of the Tsinling remained for the most part deeply submerged for a much longer period, during which masses of marine sediments continued to be deposited. It was not until the middle of Secondary (Mesozoic) times that most of it was finally uplifted by a great movement of mountain building which had no contemporary counterpart in Europe. Then its relatively soft marine rocks were crumpled into comparatively regular and parallel north-east to south-west folds of the type familiar in the Jura mountains of western Europe and in sharp contrast to the block mountains and fault-scarps of North China.

One striking feature, however, emphasizes the unity between North and South China. This is the abrupt and decisive 'step', marked as the break of slope in Fig. 5, by which the western plateau descends eastwards and which can be traced right across China from north-east to south-west, as shown in the Great Khingan range of Manchuria, the Taihang shan, the sharp truncation of the Funiu shan and the Gorge mountains, and the steep edge of the Kweichow plateau in south-west China.

After the rest of South China had become dry land, one great lake-basin—the Red Basin of Szechwan—continued to be the scene of deposit of the purple red clays, from which it derives its name, far into the Cretaceous period. Then it, too, was uplifted and in part folded along the same north-east to south-west lines. By the end of the Mesozoic era practically the whole of China had emerged.

The tremendous earth-movements which raised the Himalayas in mid-Tertiary times seem mainly to have emphasized the feature-lines which China had already received, although the north-south trend of the great ranges on the Sino-Tibetan border, which are prolonged into Indo-China, may then have been initiated. The deposition on the north-western plateaux of the famous wind-blown deposits from Mongolia known as the *Loess* (yellow earth)

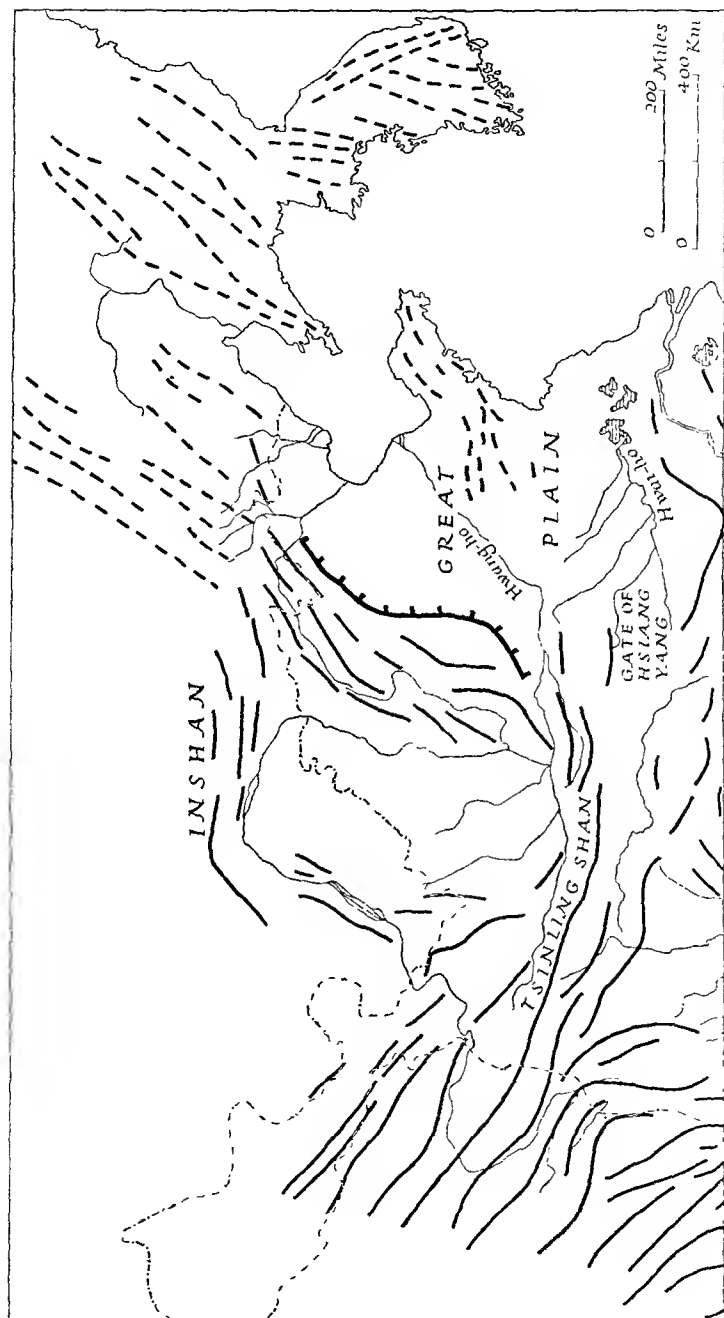


Fig. 9. Trend-lines in North China





Fig. 10. Trend-lines in South China

was the outstanding event of the Pleistocene period, broadly corresponding in time to the Würm glaciation of Europe, while the great height of western China and its Mongolo-Tibetan borderland is due to rapid uplifting after the Ice Age was over. This uplift is probably still in progress. In the region of the upper Yangtze an elevation of more than 6,000 ft. is believed to have occurred since early Pleistocene times.

### *Trend-lines*

Figs. 9 and 10 show that in China Proper three dominant trend-lines occur :—

(1) *West-East*, illustrated by the axes of the In shan, Tsinling shan and Nanling, the two former continuing the alignment of the dominant ranges of Tibet, and the Nanling possibly continuing that of the eastern Himalayas.

(2) *North-South*, illustrated by the axes of the Szechwanese Alps and of the mountain ranges which prolong them through western Yunnan into Indo-China.

(3) *North-East to South-West*, the dominant axis of the hill ranges of South China as a whole, of Szechwan and of the Peking Grid.

Fig. 5 also shows the fragments of the ancient Cathaysian continent incorporated in China and the break of slope (*a*) in the descent from the highlands of western China towards the east, and (*b*) along the fault-scarps which delimit the ancient uplands of south-east China from the Yangtze basin.

## RIVER DRAINAGE

### *The Drainage Pattern*

China is essentially a land of rivers, which to a unique extent have controlled the economic life of the country. The general plan of the drainage pattern is at once vast and relatively simple. From the immense mountain background, which so clearly defines the historic China, the great rivers descend, at first rapidly and then slowly, eastwards to the Yellow, the East China and the South China seas. By the widespread alluvium which they derive from the denudation of the interior highlands they have created the basins and plains which support nine-tenths of the population of the country. All but a very small percentage of the entire drainage is gathered into the basins of the three great arterial rivers which have a continuous course from the mountains to the seas: the

Hwang ho, the Yangtze and the Si kiang. Their basins closely correspond to the three latitudinal segments or compartments of China distinguished on structural grounds. The Hwang ho is the master stream of the segment defined by the In shan and Tsinling, the Yangtze of that between the Tsinling and the Nanling and the Si kiang of China south of the Nanling (Fig. 11).

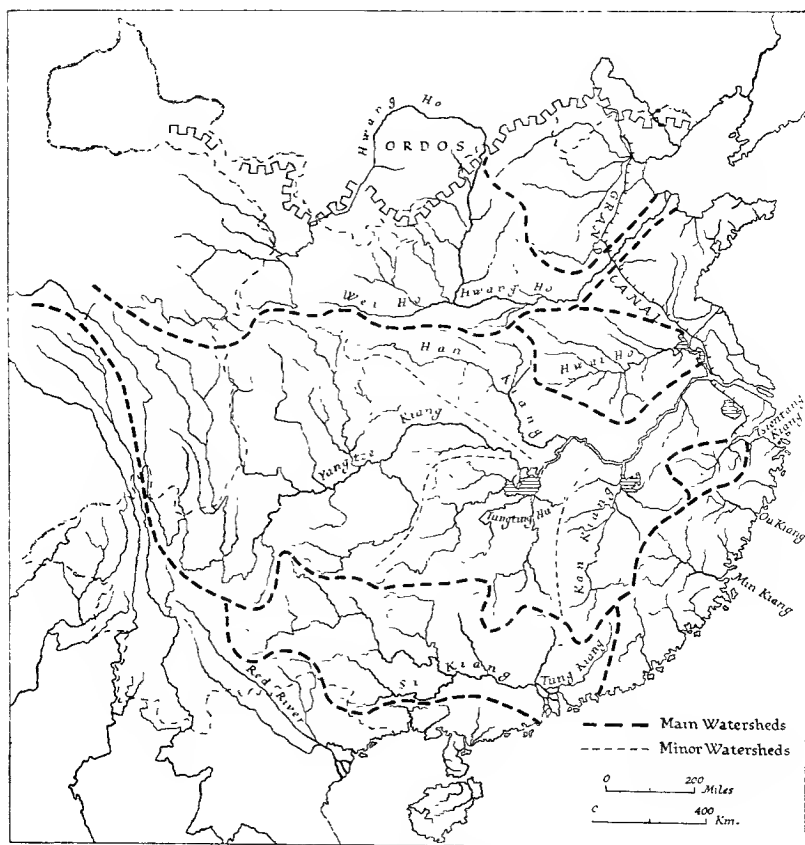


Fig. 11. River basins

Based on *New China Map* (Shanghai, 1938).

The main exceptions to this generalization are as follows :—

(a) The high plateaux of south-west China, which really form a peripheral region, are in part drained by the Red river of Tongking and the head-streams of the great rivers of Indo-China.



Plate 1. The Great falls of the Hwang ho

At Lungwangchan, fifty miles above the Hwang-Fên confluence, the river enters a gorge about 100 ft. wide in an impressive series of falls.

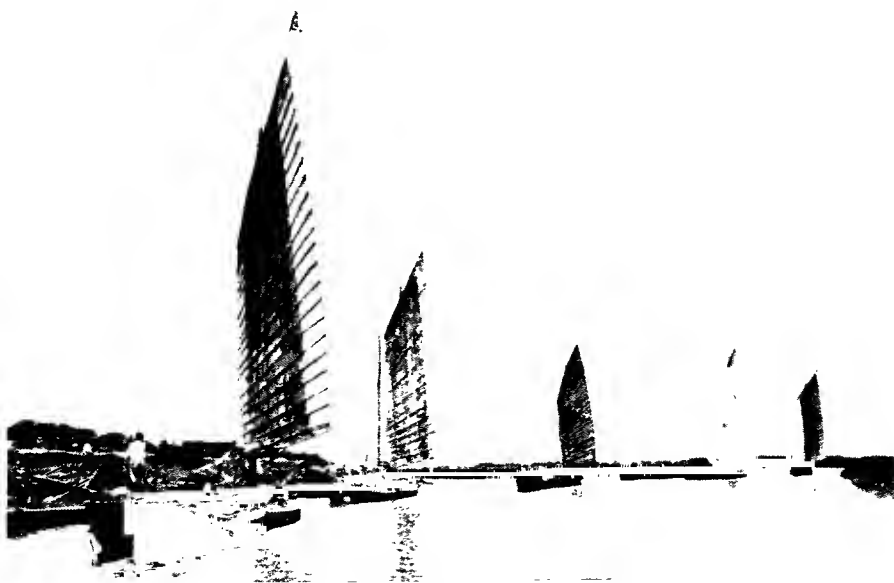


Plate 2. Boats on the Grand Canal, North China Plain



Plate 3. The Likiang gorge of the Kinsha kiang (upper Yangtze)

The peaks of the Yulung shan (over 1,800 ft. high) are permanently covered with snow. The river is flowing at about 6,000 ft. in a rocky gorge with scanty vegetation.

(b) The ancient maritime highlands of south-east China, east of the high fault-scarps which define their western limits, are drained by a number of independent streams direct to the East China sea and Formosa channel.

(c) Interposed between the drainage of the lower Hwang ho and lower Yangtze is that of the Hwai ho at the southern margin of the North China Plain. Its history is a curious one, and its original independence has been almost destroyed by its great neighbours.

(d) In the extreme north of China Proper in Hopeh (Chih'li) several streams descend from the belt of scarps trending south-west to north-east, often known as the Peking Grid, on the borders of Inner Mongolia, and converge to a common outfall at Tientsin.

### *The Hwang ho*

'China's Sorrow' though it be, the Hwang ho is a very interesting and extraordinary river. Its course of nearly 3,000 miles includes a series of mountain torrents, a great circuitous pilgrimage round the Ordos loop through semi-arid lands, a trough-like passage through mountains and a long journey across the North China Plain. Following the river from source to mouth, the following four stages can be distinguished :—

(1) The tortuous torrent stage from its source in Tibet west of the Tsaring nor (lake) at a height of some 13,500 ft. to its emergence at Lanchow in Kansu, 5,200 ft. above sea level.

(2) The Ordos loop round the ancient block of that name. The loop is composed of three great 'arms': south to north for 500 miles from Lanchow to the Houtao plain: west to east for 200 miles to Hokow: north to south for 450 miles between Shensi and Shansi provinces. The first two of these three arms are of an entirely different character from the third. In the two former the course of the river has been clearly defined by the Ala shan on the west and the In shan ranges on the north. These form an arc-like frame of mountains, on the inner side of which it flows as a navigable stream in a broad and mature valley. This part of its course has many deserted meanders which have been utilized for irrigation in the rich Houtao plain in the north-western angle. Some of these meanders are as much as 180 miles from the present course of the river. At Hokow the river bends abruptly south and falls swiftly with many rapids through a gorge-like trough between Shansi and Shensi. The fall from Paotow above the bend to

T'ungkwan at the southern end of the arm is from 3,300 to 1,000 ft. In this long section it shows every evidence of immaturity and is unnavigable, except for short stretches, but the cataracts offer opportunities for the generation of hydro-electric energy (Plate 1). Near the southern end of this arm it receives on its left bank the

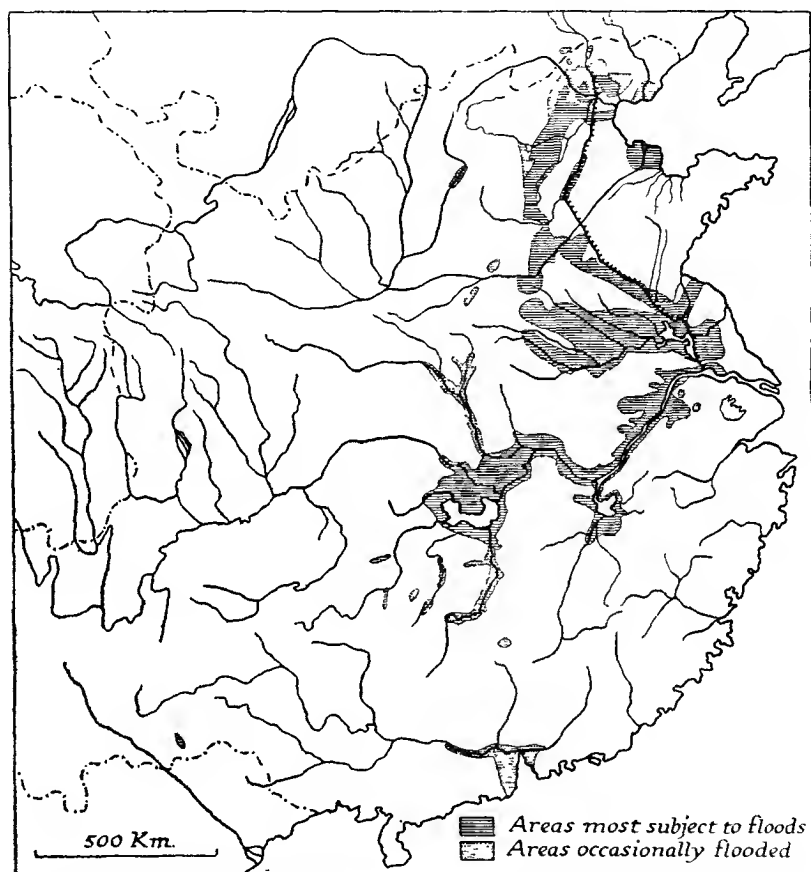


Fig. 12. Areas liable to floods

Based on Buck, J. L., *Land Utilization in China: Atlas*, p. 29 (Nanking, 1937). This map covers flood records of the present century only; the distinction between the areas most subject to flooding and those occasionally flooded is somewhat arbitrary. Many of the most fertile agricultural areas are included.

Fên ho, one of its few important tributaries, which collects the drainage of several rich loess-filled basins within the Shansi plateau.

(3) The Hwang ho then enters the wide loess-filled west-east tectonic depression at the base of the Tsinling shan, drained by

the Wei ho coming from the west. The main stream takes on the direction of its tributary and flows eastwards by Tungkwan through the widening funnel-shaped valley and emerges into the plain of North China, the city of Kaifêng approximately marking the end of its valley and the beginning of its flood-plain stage. The great corridor thus occupied by the Wei ho and Yellow river has played an important part in the development of China and is the historic route to the west. It should also be noticed that the large concentration of waters near the junction of the Wei ho with the Hwang ho is one of the major causes of the floods in the plains below (Fig. 12).

(4) The lower course of the Hwang ho below Kaifêng through the great plain of North China is that which has earned for it the title of 'China's Sorrow' or 'The Scourge of the Sons of Han'. It is itself, however, the main creator of the plains, through the rich loads of silt and loess with which it has filled up this formerly submerged area. At one period or another it has occupied almost every part of the plain from the neighbourhood of Tientsin in the north to the lakes of northern Kiangsu in the south. The Chinese records of the extraordinary vagaries of its course below Kaifêng go back to a very early period. From 602 B.C. to A.D. 1194 it flowed out into the Gulf of Pohai to the north of its present outlet, and at a stage earlier than that, well to the north of Tientsin, not far south of Shanhaikwan where the Great Wall reaches the sea. From 1194 to 1853, its course from Kaifêng was east-south-east to an outfall far south of the Shantung Uplands, usurping the original bed of the lower Hwai ho, which drains the slopes of a slight ridge projecting into the plain south of Kaifêng and also those of the northern Funiu shan. Then, as a result of great floods and dyke destruction in 1853-5, the Hwang ho changed to its present course with an outfall north of the Shantung Uplands, some 250 miles to the north of its former mouth. There have been ominous signs in the floods of 1933, 1935, and during the present war with Japan of a new diversion to the south. The problem of controlling the lower course of the river and preventing floods of appalling magnitude and destructiveness is one of great difficulty (Fig. 13).

The floods are due to several causes, of which three are particularly important :—

(a) The great concentration of water above Tungkwan in a 'river-node', formed by the junction with the Hwang ho of the



Fên ho from Shansi and the Wei ho and Lo ho from Shensi. Its effect may be gauged by measurements made during the floods of 1933, said to be the greatest since those of 1855. These showed a volume of about 12,000 cubic metres per second at Lungmen,

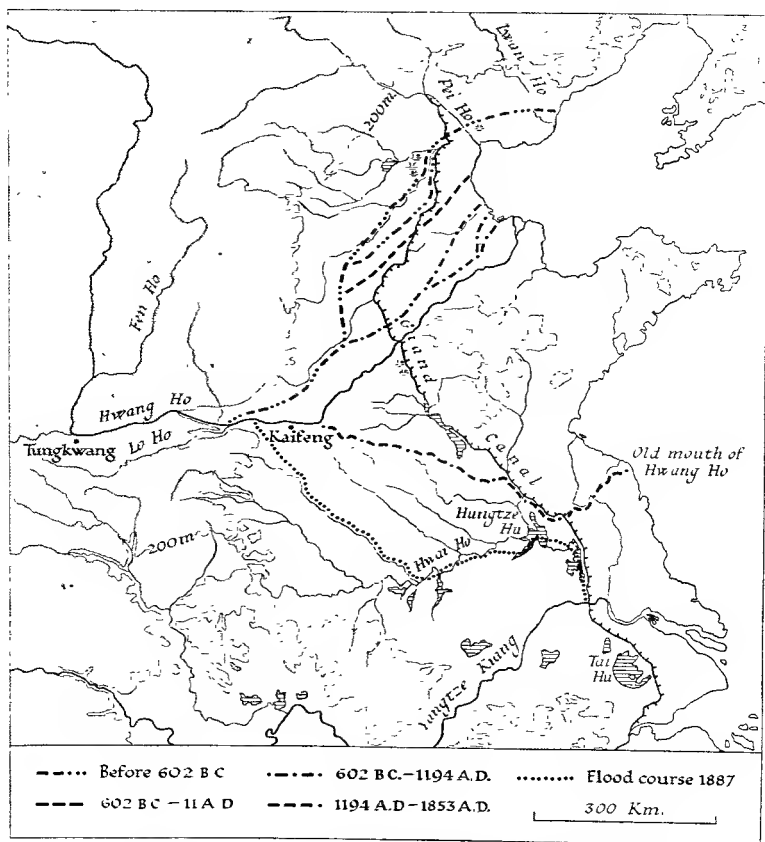


Fig. 13. Changes in the course of the Hwang ho

Based on (i) Cressey, G. B., *China's Geographic Foundations*, p. 160 (New York, 1934), and (ii) Mallory, W. H., *China: Land of Famine*, p. 49 (New York, 1926). The present course of the Hwang ho is shown on the folding map at the end of this volume.

above the node, and of about 23,000 at Shenhsien below it, the tributaries thus being responsible for nearly doubling the water content within a very short distance. The rise in this zone of concentration is often extremely rapid and may be caused by the sudden melting of ice in spring, as well as by violent summer rains.

(b) The bare, treeless character of the loess areas, so widely distributed in the Hwang ho basin. No soil lends itself more easily to erosion. Extensive afforestation might arrest the destruction of the loess areas and stop the formation of gullies, down which floodwaters sweep with overwhelming violence. This is a problem of national importance and is discussed in Chapter VII.

(c) The raising of the river bed through silt deposition in its lower course above the level of the surrounding plains. For this the dykes, which have been built to keep it from wandering, are themselves largely responsible, since the silt, instead of being spread over a wide area, becomes concentrated in the river bed itself. Hence it flows 'on the top of the plains', the river surface even at low water being in places as much as 15 ft. above the land level and 30 ft. at high water (Fig. 19).

The problem of flooding has engaged the attention of Chinese engineers from the time of the semi-legendary Emperor Yü. It was the subject of detailed study and suggestions by the China International Famine Relief Commission in the early twenties of the present century. More recently it has been tackled by the National Economic Council, set up by the Chinese Government. The very promising work of this body was unfortunately interrupted by the Japanese invasion of 1937. It was mainly directed to repairing and strengthening the dykes and expediting the river discharge by making short cuts near its mouth to prevent the flow of the river being retarded by the entry of the tide, which leads to further depositions of silt and raising of the bed. It was freely admitted, however, that these measures were palliative in character, pending a more drastic regulation.

*The Hwai ho and the Hai ho.*—The problem of the Hwai drainage is hardly less serious than that of the Hwang ho which, as already stated, usurped its bed from 1194 to 1853. When its great neighbour deserted it after the latter date, the bed silted up, and the Hwai, without any proper outlet, has since tended to overrun an immense tract of country in eastern Kiangsu. Its waters have normally discharged into the Grand Canal and so eventually into the Yangtze and into the lakes of northern Kiangsu parallel with the canal. The National Economic Council, in conjunction with the Kiangsu provincial government, was grappling with this problem also at the time of the Japanese invasion. The main objectives, in part achieved, were to treat the Hungtze, the largest of the lakes, as a reservoir for flood detention and incidentally also for irrigation

and navigation, and to construct a new direct outlet to the sea for the surplus flood waters. The improvement of the largely derelict Grand Canal as a great north-south waterway was a secondary but important object of both Hwang and Hwai projects (Plate 2).

Much useful work had also been done, and more was projected, by the North China River Commission, established in 1928. This was dealing with the problems presented by the numerous rivers of the Hopeh basin north of the delta of the Hwang ho which, at the periods of its maximum northward extension, must have received them as tributaries. The watershed of many of these rivers extends far back among the hills of the Peking Grid into north-east Shansi and south-west Chahar and in the north into Jehol, but nearly all converge to a common outlet at Tientsin. In the summer rainy season this becomes hopelessly overcharged, and widespread floods result. The remedial measures in progress included dyke and groyne construction, drainage and irrigation channels and the provision of new escape outlets to the sea (Fig. 20).

### *The Yangtze Kiang*

Chinese civilization originated in the basin of the Hwang ho, but that of the Yangtze has long been its heart and focus, and here it has developed its most characteristic expression. It would be hard to imagine for any country a more magnificent arterial highway than the main stream of the Yangtze provides for China from the borders of Tibet to the eastern sea, and its great navigable tributaries, themselves comparable in size to the largest of European rivers, provide a wonderful network of waterways linking north and south to the central corridor. It is this, more than any other single geographical factor, which has made possible the growth and consolidation of so vast a cultural and political entity as China.

It is only in modern times and under foreign influence that the name Yangtze has been applied to the whole extent of the river from its source in eastern Tibet at a height of 16,000 ft. to its outlet in the East China sea, a course of some 3,200 miles. The Chinese long confined the use of the term to the last 300 or 400 miles where it flowed through a region anciently known as Yang. Quite early, however, there was recognition of a single great river, the Ta kiang (Great River), from western Szechwan to the sea, and of this the Min kiang, rising in the Min shan, a part of the Szechwanese Alps, and joining what we now call the upper Yangtze

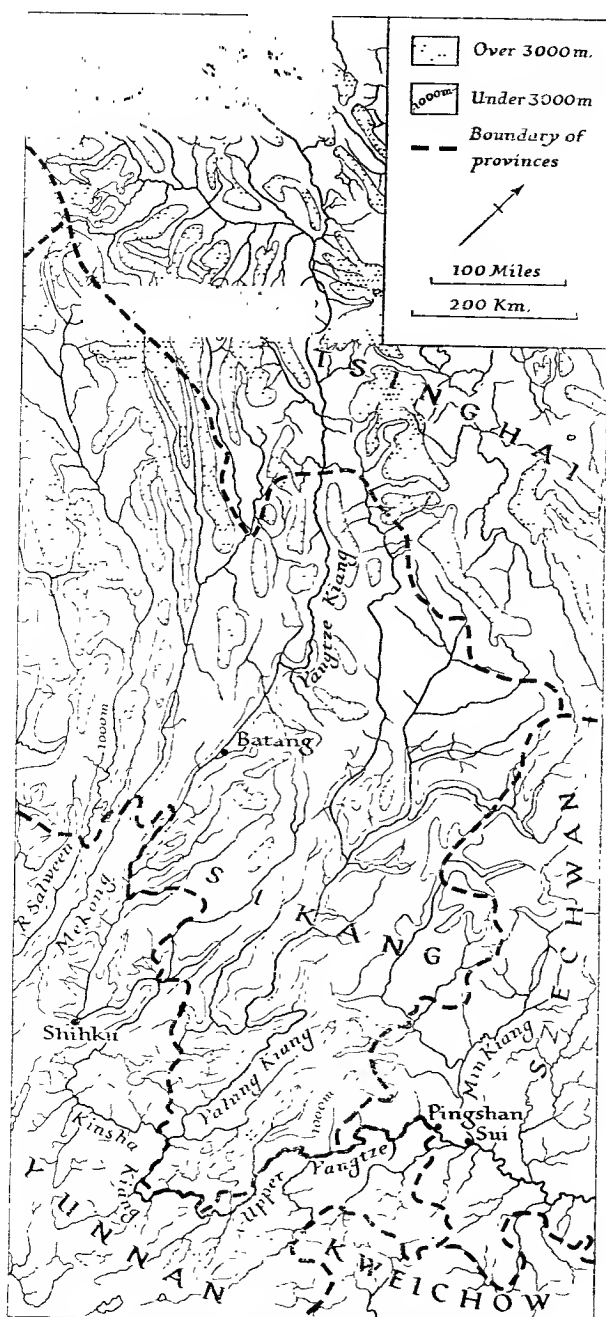


Fig. 14. The upper Yangtze

Based on *Bathymorphological Map of China* (Shanghai and Chungking, 1939).  
Note the orientation of this map.

at Sui, was considered the source. 'The course of the Kiang begins on the Min shan' is a statement in one of the earliest Chinese books, and in a sense it is justified, for the upper Yangtze, before it enters the Red Basin, has an entirely different character from the rest of the river and has had a distinct origin. The Chinese still habitually speak of the upper Yangtze as the Kinsha kiang (River of Golden Sand). Following the river from source to mouth, the following five stages can be distinguished :—

(1) The upper Yangtze, to use the name familiar to Europeans, includes the whole course from its high Tibetan source to Pingshan, a short distance above Sui, at the entry to the Red Basin, where it becomes navigable. Pingshan stands at an elevation of about 800 ft. and is about 1,630 miles from the sea, so that in approximately the first half of its course the Yangtze falls over 15,000 ft. The first 400 miles of its course, approximately south-eastwards, is on the Tibetan plateau, and then to Batang (in Sikang) it negotiates the steep descent to the lower but still very high level of the Chinese borderland. Batang is about 9,000 ft. above sea level, and so the Yangtze falls about 7,000 ft. in the first 500 miles of its journey. From this point it is known as the Kinsha kiang. From Batang it runs almost due south in a deep groove and parallel to the similar grooves of the Mekong, Salween and Irrawaddy, the great rivers of south-east Asia, all being relatively near neighbours. This direction is in accord with the north-south trend of the feature lines of the Tibetan border and northern Indo-China (Fig. 14).

At Shihku, the Yangtze suddenly deserts this course and makes an abrupt elbow-bend to the north-north-east. It follows this direction for a considerable distance, and then again bends abruptly to the south in another long groove as far as Sicheng. It then turns east and receives from the north a big tributary, the Yalung, which has been flowing parallel to it for a great distance and forms another of the remarkable series of rivers flowing from north to south in parallel grooves. The Yangtze then trends north-eastwards into the Red Basin of Szechwan and constitutes the boundary, in this part of its course, between the provinces of Szechwan and Yunnan (Plate 3).

The course of the Kinsha kiang between Batang and Pingshan, the head of navigation, is about 1,000 miles, during which it descends about 8,000 ft., an average of 8 ft. per mile, as compared with 14 ft. per mile in the torrent stage above Batang (Paan).

(2) At Pingshan the essential Yangtze of commerce begins. Thence the river flows north-eastwards through the Red Basin, conforming to the general trend of the feature lines, and parallel to the great scarps which delimit the basin on its south-eastern side. From the north it receives the drainage of practically the whole of the Red Basin in the form of large and mainly navigable tributaries. The most important of these tributaries from west to east are the Min, which joins the main river at Sui, the Lu and the Kialing, which drains the whole of the central and much of the northern part of the Red Basin and joins the Yangtze at the great river port of Chungking, the present capital of 'Free China'.

The Yangtze itself between Chungking and the beginning of the Gorge mountains, which close in the Red Basin on the east above Wanhsien, is about 600 yds. in width and has an average depth of from 20 to 30 ft.

(3) The next stage is the passage of the Yangtze through the far-famed gorges between Wanhsien and Ichang. These gorges have precipitous cliffs as much as 2,000 ft. high, made up of sedimentary rocks, largely limestone, over a granite core. Here the river is immature, with a rapid current of 14 knots, and there are about a dozen major and numerous minor rapids (Plates 4, 5).

(4) At Ichang below the gorges, at a height of only about 130 ft. and still nearly a thousand miles from the sea, the Yangtze enters its great Central Basin. This, in contrast to the essentially upland basin of Szechwan, is a wide alluvial lowland studded with lakes. Used in its widest sense, it really includes two basins, that of Hupeh and the Tungting lake on the west and that of north Kiangsi and the Poyang lake on the east, separated by hilly country through which the Yangtze passes between Hankow and Kiukiang.

This Central Basin, situated in the very heart of China Proper, has a wonderful geographical nodality, for here the Yangtze receives its major tributaries from the north-west and the south and itself becomes virtually an ocean highway. The volume of water in the main river and in the tributaries and lakes varies greatly between the wet summer and dry winter seasons, but the lakes act as reservoirs which mitigate, although they by no means prevent, the tendency to excessive flooding in summer (Fig. 12).

Between Ichang and Hankow, the Yangtze receives the greater part of the drainage of Hunan through the Tungting lake, thus giving it wide contacts with south-central China. The lake is about 75 miles long by 50 miles broad, and into it flow the Siang,

whose valley provides one of the two great corridors to Canton, and the Yuan, the chief route from Central China into Kweichow, and particularly important for its timber traffic.

The greatest of all the Yangtze tributaries, the Han, joins the trunk river at Hankow. The two cities of Hankow and Hanyang, which incorporate its name, are situated on either bank at its confluence, with Wuchang on the opposite (south) bank of the Yangtze. The Han is the major route from Central China to the north-west. Its course from its sources in the southern Tsinling shan reproduces many features of that of the Yangtze itself. Set in between the Tsinling and the Tapa shan is the high-lying, mountain-girdled basin of the upper Han, which is comparable in miniature to that of the Red Basin on the farther side of the Tapa shan. It is a fertile plain about 60 miles long by 12 miles in width, and Hanchung at its western end corresponds to Chêngtu. From this upland basin below Hingan, the Han descends for a long distance, through gorges almost comparable in grandeur to those of the Yangtze, to its lower valley which gradually broadens out into the Hupeh lowlands.

The last important element in the complex of waterways within the Central Basin is the Poyang lake and its river feeders in the province of Kiangsi. In many ways it is a replica of the Tungting lake system, and the valley of the Kan, which flows into it, rivals that of the Siang as a route-way to the south.

(5) After leaving the Central Basin, the Yangtze flows for a considerable distance north-eastwards through Anhwei before the deltaic stage begins. Both the river and its valley are broad, but the country on either side is hilly, the eastern extensions of the Hwaiyang shan bordering it on the north and the Hwang shan to the south. It does not emerge from the hills or alter its direction until it has passed Nanking, which is often taken to mark the apex of the so-called delta. Its original mouth, however, was probably at Chinkiang, a little further downstream, where it is crossed by the Grand Canal, and the characteristic features of the delta begin from this point (Plate 53).

The 'delta' is a roughly triangular area of lake-studded alluvium, bordered on the south-east and north-west by hills which were probably sea cliffs before the bay that occupied its site was filled in by the great load of sediment which the Yangtze has deposited. The deltaic plain, as seen today, is certainly of very recent origin, although there are a few isolated hills which must once have been



Plate 4. Ching rapids, Yangtze kiang

A number of junks are awaiting haulage over rapids in the gorges between Szechwan and the Central Yangtze Basin.

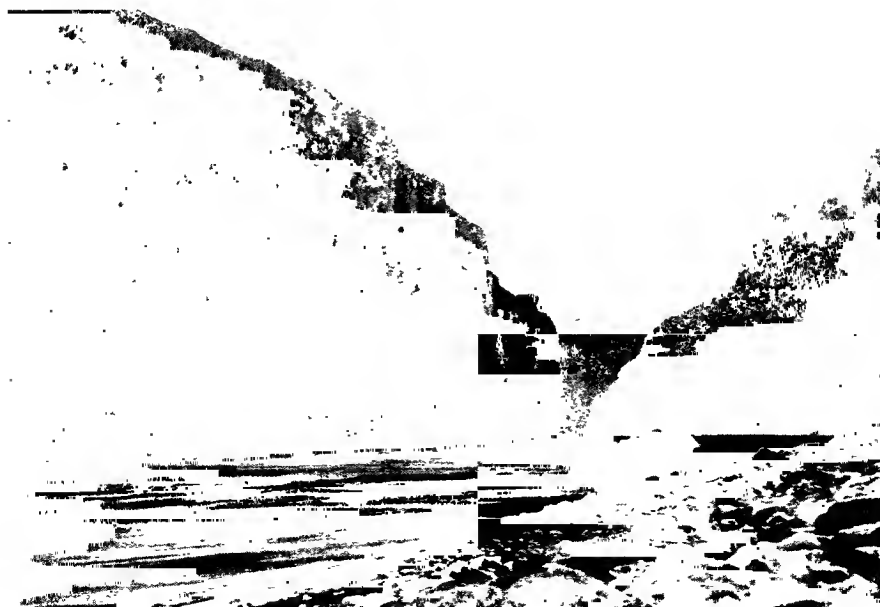


Plate 5 Kunglung gorge, Yangtze kiang

A characteristic stretch of the gorges between Wanh sien and Ichang.





Plate 6. The Pei Kiang

Heavy river traffic is seen along this route from Canton to the Cheling pass, now followed by the Canton-Hankow railway. Intermittent lowlands along the river are closely settled and highly cultivated; the ranges of the Nanling are visible in the background



Plate 7. The Kwei Kiang

The Kwei Kiang, here seen between Wuchow and Kweilin, affords another important route from Kwangsi to Hunan. The river is lined by sandbanks and flows through hilly country.

islands. The area still seems to be subsiding, but the rate of deposition of sediment more than counterbalances it (see p. 101).

The historical evidence suggests that the greater part of the delta has been formed within the last three thousand years. The outer portions such as the Haimen peninsula and Tsungming island, now among the most densely peopled regions in China, were no more than sandbanks a thousand years ago, and the rate of outward growth in recent times has been calculated at about a mile in every seventy years. The numerous lakes, of which the Tai hu, immediately west of Soochow, is much the largest, are probably remnants of the original bay. The whole deltaic area is intersected in chess-board fashion with a most intricate network of waterways, canals and canalized streams, which not only drain and irrigate it and provide it with invaluable silt for fertilizing the fields but give its teeming population a marvellous system of water transport. It is not, however, a true delta in the usual sense of the term, as illustrated by the delta of the Nile in the tideless Mediterranean. The deposits of the Yangtze are constantly re-sorted by strong tidal currents. The numerous shoals and shifting sandbanks, both within and without the actual estuary, present serious problems, particularly that of maintaining a channel sufficiently deep for the largest modern liners in the actual exit of the Yangtze (Figs. 50, 51).

### *The Si kiang*

The name Si kiang (West River) is so given in contrast to the Tung kiang and Pei kiang (East and North Rivers), which converge with it to the Canton delta. The use of the name is locally restricted, but has been extended to denote the whole drainage system which, originating in the high plateaux of Yunnan and Kweichow and on the southern slopes of the Nanling, discharges into the South China sea through the Canton delta (Plate 6).

This system provides important east-west contacts for South China, but the Si kiang is hardly comparable with the Yangtze as an arterial route. The Yangtze system covers the whole of Central China; the Si kiang serves the needs of only a limited part of South China. There are no large basins in its middle or upper course analogous to those of the Central Basin or Red Basin of Szechwan. The valleys of the main river and its principal tributaries are relatively narrow and deeply trenched in all their upper courses.

The Si kiang is formed by the convergence of a large number of

head-water streams descending from the high Yunnan-Kweichow (Yunkwei) tableland. These are gathered into two principal arteries which join near Sünchow in eastern Kwangsi. The principal components of the northern artery are the Hungshui kiang (from Kweichow), Lung kiang (from the Kwangsi-Kweichow borders), and Liu kiang (from south-east Kweichow). Those of the southern are the Yu kiang (from south-east Yunnan) and the Tso kiang, whose principal head streams rise south of the international boundary in north-east Tongking. The junction of the Yu kiang and Tso kiang, a little above the city of Nanning in southern Kwangsi, constitutes the Si kiang proper. At Nanning the river is wide and deep, but there are several difficult rapids between Nanning and Sünchow, where the Si kiang receives the Hungshui.

Wuchow, the centre of a small basin, is the most important nodal point in the whole Si kiang system above the delta. Upon it converge all the avenues of water communication in Kwangsi province and from beyond its western borders. Here, too, the Kwei kiang, the last tributary of the Si kiang above the delta, joins it from the north and gives somewhat difficult access to Kweilin. Below it these different avenues are contracted into a single corridor on which is concentrated the great bulk of the trade between Canton-Hong Kong and the west. This corridor, however, cannot compare with that of the lower Yangtze. At its exit from the Wuchow basin, where it is approximately a mile wide, the Si kiang enters a gorge section where it contracts to about 270 yards and its current is proportionately quickened. Considerable obstruction is also caused by sandbanks (Plate 7).

The deltaic stage begins at Samshui. The so-called 'Canton delta' is a complex one, the combined work of the Si kiang, the Pei kiang from the north and the Tung kiang from the east. The main channel of the Si kiang, below its junction with the Pei kiang at Samshui, swings towards the south, keeping to the western margin of the delta and enters the sea west of Macao. At Samshui the Si kiang sends off to the east a branch known as the Chu kiang or Pearl river. This forms the main channel of the delta and Canton is situated upon it. In its lower course southwards, to enter the sea in a broad estuary on the eastern margin of the delta, it is often known as the Canton river. The main deltaic plain, about sixty miles long by twenty to twenty-five miles wide, lies between the two main channels of the Si kiang and the Chu kiang or Canton river and is itself intersected with valuable waterways.

The Tung kiang, which drains most of eastern Kwangtung, forms a subordinate but large delta of its own on the eastern side of the upper portion of the Canton estuary (Fig. 43).

Canton itself, situated at the head of the broadest deltaic outlet, is the great focus of the river and sea-borne trade and the terminus of ocean navigation. A great contribution to its importance is made by the Pei kiang, not so much on account of its navigation facilities as because its valley gives access to both the vital corridor routes to the Central Basin of the Yangtze, those of the Siang valley through Hunan and of the Kan valley through Kiangsi. Canton is therefore the terminus of the two greatest north-south routes of China (one of which is now followed by the Peiping-Hankow-Canton railway) as well as being the gateway and outlet of the whole Si kiang system of navigation (Plate 6).

### *The Drainage of the South-Eastern Uplands*

The ancient uplands of south-east China form a distinct hydrographic region, and the high fault scarps—collectively known as the Tayuling in the southern and the Wuyi shan in the northern portions—which separate them from the Yangtze drainage basin on the west, constitute one of the most important divides in China. The area so enclosed includes southern Chekiang, the whole of Fukien and the extreme eastern part of Kwangtung. It presents an excellent example of the 'trellis' type of drainage pattern. There are many longitudinal valleys, often quite broad, tending south-west to north-east in accordance with the prevailing trend of the feature lines, but their drainage has been 'captured' by rapid coastal streams which have pushed their headwaters backwards by eroding the transverse ridges.

The best and largest example of this trellis drainage is that of the Min kiang of Foochow, the master stream of central Fukien, which has a whole series of tributaries joining it through longitudinal valleys. In many cases the streams of these interior valleys are useful for boat traffic, but the master rivers which give access to them from the coast are impeded by many rapids and obstructions where they excavate their way through the transverse ridges (Plates 93, 96).

The trellis pattern is also seen in the Wu kiang of south Chekiang, with Wenchow as its port, in the Lung kiang of south Fukien, and in the Han kiang of eastern Kwangtung, with Amoy and Swatow as their respective ports.

The Tsientang kiang or Hangchow river, which flows along the northern margin of this belt of the south-eastern uplands rather than within them, comes into a different category, for the course of the main river is longitudinal rather than transverse. This river flows between the uplands of Chekiang, which are part of the south-east China system, and a second group of uplands in Anhwei province, lying to the south of the delta and the Poyang hu. The uplands are dissected by tributaries of the Tsientang, flowing generally in wide valleys.

### THE MAJOR REGIONS OF CHINA PROPER

In the light of this survey of the ground plan and river drainage of China Proper, it is now possible to make a broad classification of the major topographical regions of the country (Fig. 15).

#### NORTH CHINA

The great latitudinal sector of North China between the Tsinling and In shan belts falls clearly into three divisions :—

(A) *The Shantung Uplands* on the east. This old worn-down massif, as has been noticed, is part of an Archean group which includes Korea, Liaotung and eastern Manchuria. It is now isolated from the rest by the Gulf of Pohai and is the only one of the series which lies within China Proper.

(B) *The North China Plain*, the vast alluvial lowland mainly built up by the deposits of the Hwang ho.

(C) *The Loess Plateaux of north-west China*, forming the provinces of Shansi, northern Shensi and Kansu. This is the most complex of the three divisions of North China and includes several important sub-regions which will be separately distinguished in the regional description.

(D) *The Central Mountain Belt* of the Tsinling shan and Tapa shan decisively distinguishes North from Central China, and is of such magnitude and width as itself to constitute a major topographical region. It extends to the Gorge mountains mentioned below.

#### CENTRAL CHINA

The sector lying between the Tsinling axis on the north and the Nanling on the south but limited on the south-east by the coastal ranges with their south-west to north-east trend-lines, is, with one



Plate 8 The Tai shan, Shantung

The hills are characteristic of many granite uplands in Shantung. Cultivated alluvial fans with a striking terrace of redeposited loess mixed with gravel are seen.

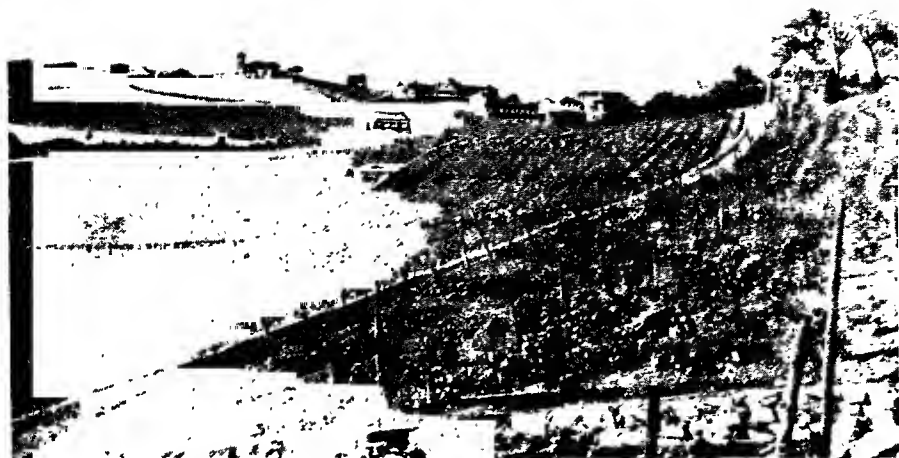


Plate 9. Vineyards near Chefoo, Shantung

These famous vineyards overlooking Chefoo harbour give the country a Mediterranean aspect.

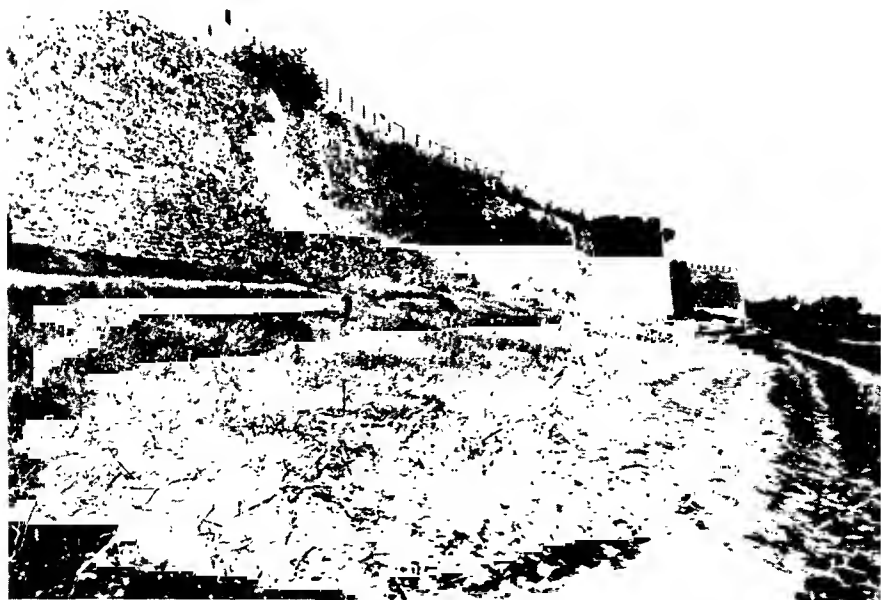


Plate 10. Town wall at Weih sien, Shantung

important exception, the basin of the Yangtze proper (as distinct from the Kinsha kiang) and contains the following major topographical regions :—

(E) *The Sino-Tibetan Borderland*, forming the western mountain ramparts of China, extends southwards from Kansu through western Szechwan to north-western Yunnan and includes also parts of the new provinces of Tsinghai and Sikang. There are lofty mountains, some over 20,000 ft., with glaciers and areas of permanent snow feeding the rivers, which flow in deep gorges. The region has extensive forests, coniferous on the higher slopes and deciduous on the lower. It is a thinly-peopled area with aboriginal tribespeople and some Chinese.

(F) *The Red Basin of Szechwan*. This immense mountain-girdled upland basin of west-central China is dissected by river action into hilly country. It is one of the best defined geographical units in China and, indeed, in the world; richly endowed with natural resources, it constitutes a granary within a mountain fortress.

(G) *The Central Yangtze Basin*, separated from the Red Basin by the so-called Gorge mountains, through which the Yangtze cleaves its way in striking canyons. Included in this Central Yangtze Basin is the relatively depressed zone of south-central China (Kiangsi and Hunan provinces), with its wide corridor valleys converging on the big Tungting and Poyang lakes and so to the Yangtze itself. The region includes several hilly belts between the valleys and subordinate basins but has a definite unity.

(H) *The Lower Yangtze Valley and Delta*. The so-called Delta, with its apex a little below Nanking, can be distinguished as a distinct physiographic unit, but it is so closely linked with the lower valley of the Yangtze in southern Anhwei that the two really constitute a single topographical region. This is defined on the north by the low hills which mark the eastward extension of the Hwaiyang shan and then by the large lakes and marshes of the lower Hwai, which have always formed a thinly-peopled belt between the North China Plain and the deltaic area of the Yangtze. To the south it is bounded by the highlands of south-east Anhwei (including the chain of the Hwang shan) and the adjacent part of Chekiang. The great fertility of this Lower Yangtze Valley, in conjunction with its industrial and commercial activity, makes it the most significant economic region in modern China.



(I) *The Hangchow Basin.* This is a small but important region lying between the lower Yangtze valley, as defined above, and the major region of the South-Eastern Uplands. The basin is that of the Tsientang kiang or Hangchow river, which is a longitudinal stream flowing north-east into the funnel-shaped Hangchow wan. The basin occupies nearly half of the province of Chekiang. It lies to the north of the Nanling axis and therefore within the great central sector of China, the only portion of that sector which is not drained to the Yangtze. It is particularly important as affording much the shortest land route from the delta to south-central and south-west China and is followed by the recently constructed railway from Hangchow to Nanchang and Changsha.

#### SOUTH CHINA

In the southern sector of China beyond the Nanling axis the south-east and the south-west are very clearly defined topographical regions, but the two 'Kwang' provinces of the extreme south—Kwangtung and Kwangsi—present a great variety of structural and relief features.

(J) *The South-Eastern Uplands*, embracing southern Chekiang, the whole of Fukien and much of eastern Kwangtung, form a region of marked individuality which, as we shall see, is strikingly reflected in its human geography. It is one of the most ancient land areas in China, representing a remnant of the southern part of the old Cathaysian continent. It is therefore analogous to the Shantung-Liaotung massifs in the north, but has a more definite structural pattern and consists of a closely-packed series of ranges trending north-east, parallel to the broken coast, and culminating on the west in the long range of the *Wuyi shan*\* or *Shaling*, the high and difficult divide between the southern part of the Yangtze basin and the numerous rivers which cut through the ridges transversely and have independent outlets in the Formosa channel and South China sea. The region thus turns its back on the interior, and its life is concentrated on the maritime fringe. The ranges terminate to the north-east in the Chusan archipelago off the coast of northern Chekiang. The southern limit is less determinate but may be placed at the Canton delta.

\* There are several local names, but the term *Wuyi shan* is coming into use as the best collective designation.

(K) *The Nanling Belt*, although much lower and on a smaller scale than the Central Mountain Belt, this east-west thrust zone, separating the Yangtze and Si kiang basins and extending from the South-Eastern Uplands to Yunnan, is itself a region of considerable width. As a barrier it cannot be compared with the Tsinling shan-Tapa shan, but as a divide, in respect both of physical and human geography, it is almost equally significant.

(L) *The Canton Delta and Central Kwangtung*. Three important rivers, the Si kiang, Pei kiang and Tung kiang (the West, North and East rivers), drain the uplands of central Kwantung and converge to build up the rich alluvial plains known as the Canton delta, the richest and most important sub-region of South China.

(M) *South-Western Kwangtung and Hainan* consists of (i) a broad belt of coastal lowlands, interspersed by low hills due to igneous intrusions, and backed by a range which forms the southern watershed of the Si kiang. This southern littoral of China, drenched with monsoonal rains, is the most tropical region of the country and is in part bordered by mangrove swamps. Climatically similar and with similar economic potentialities is (ii) the large island of Hainan, from which the Luichow peninsula is separated only by a narrow strait. For this reason and also on account of their propinquity and close administrative connection south-western Kwangtung and Hainan are grouped together for purposes of regional description.

(N) *The Kwangsi Basin*, occupying the centre of the province, has very distinctive features. It is in appearance a platform, in part composed of pure limestone with a landscape of the Karst type and characterized by singularly beautiful pinnacles, which have been described as 'so exquisite in form and arrangement that they look like a huge piece of rockery in a Chinese garden'. On the west and north-west this platform rises by terraces to the higher levels of the Yunkwei Plateau, of which it may be considered a foreland.

(O) *The South-Western Tableland* or, as Chinese geographers call it, the *Yunkwei Plateau*, from the names of the two provinces of Yunnan and Kweichow whose surface it forms. This is an immense and deeply dissected tableland with an average elevation of about 4,000 ft. in Kweichow and 6,000 ft. in Yunnan and mainly composed—in contrast to the South-Eastern Uplands with their ancient crystalline rocks and granitic intrusions—of limestone and other marine rocks.

*Summary of the Major Regions and Sub-regions of China Proper*

## NORTH CHINA

## (A) The Shantung Uplands

- (1) The Western Upland
- (2) The Weihsien Valley
- (3) The Eastern Upland

## (B) The North China Plain

- (1) The Middle Plain
- (2) The Hopeh Basin
- (3) The Basin of the Lower Hwai ho

## (C) The Loess Plateaux

- (1) The Shansi Plateau
- (2) The Peking Grid
- (3) The Shensi Basin
- (4) The Wei ho Valley
- (5) The Kansu Corridor

## (D) The Central Mountain Belt

- (1) The Tsinling shan
- (2) The Tapa shan
- (3) The Upper Han Valley

## CENTRAL CHINA

## (E) The Sino-Tibetan Borderland

## (F) The Red Basin of Szechwan

- (1) The Eastern Folded Region
- (2) The Central Plateau
- (3) The Min Basin and the Chêngtu Plain

## (G) The Central Yangtze Basin

- (1) The Hupeh Basin
- (2) The Lower Han Valley
- (3) The Tungting Lake-basin
- (4) The Poyang Lake-basin

## (H) The Lower Yangtze Valley and Delta

- (1) The Lower Valley
- (2) The Delta

## (I) The Hangchow Basin

## SOUTH CHINA

## (J) The South-Eastern Uplands

## (K) The Nanling Belt

## (L) The Canton Delta and Central Kwangtung

## (M) South-Western Kwangtung and Hainan

- (1) South-Western Kwangtung
- (2) Hainan

## (N) The Kwangsi Basin

## (O) The South-Western Tableland (Yunkwei Plateau)

- (1) The Kweichow Plateau
- (2) The Yunnan Plateau

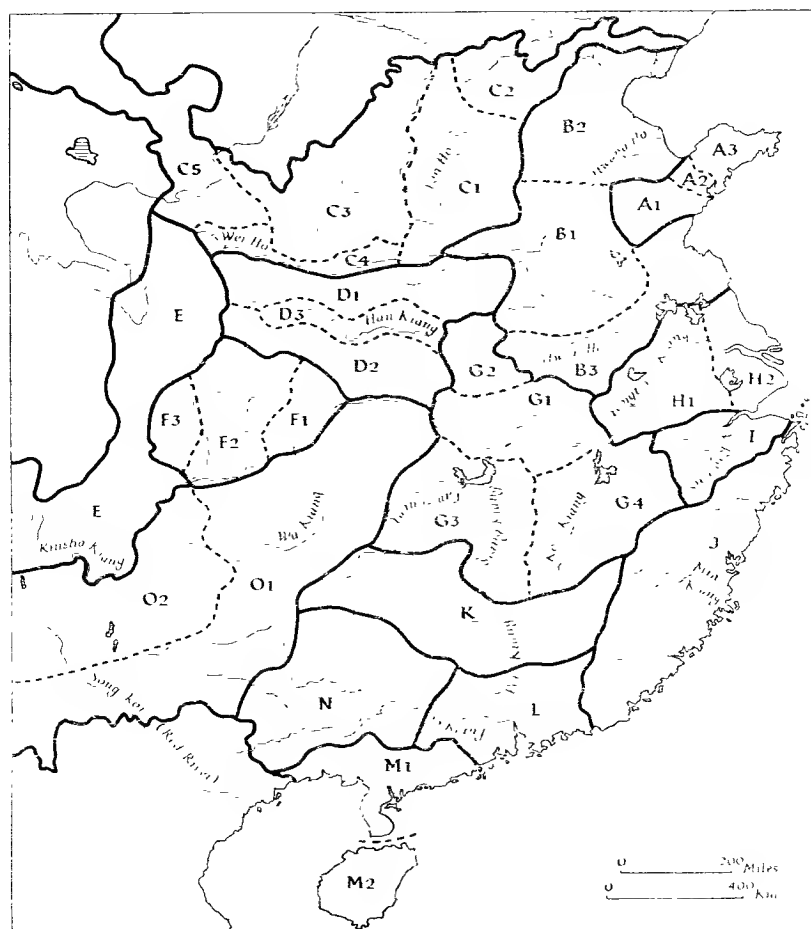


Fig. 15. The major regions of China Proper

Based on 1 : 4 million G.S.G.S. Series 2957, *Asia*, sheet 34, China (1939).

The major regions of China Proper, some of which are divided into sub-regions, are discussed in Chapters III, IV, V. The boundaries shown are purely tentative, and this map may be usefully compared with Figs. 5, 11, 56-58, 101 and 103.

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The main details of the geology and physical features of China can be found in the following general works :—

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## Chapter III

### NORTH CHINA

Introduction : The Shantung Uplands : The North China Plain : The Loess Plateaux : The Central Mountain Belt : Bibliographical Note.

#### INTRODUCTION

North China includes the whole of China Proper to the north of the great transverse belt formed by the Tsinling shan and its eastern continuations in the Funiu shan and Hwaiyang shan. This wide belt is the most decisive climatic, vegetational and economic divide in the whole country (see p. 79), and North China has certain characteristics which distinguish it from all other parts of the Republic. It is, in fact, a major natural region. Its unity is particularly expressed in its very distinctive type of climate—long and severe winters, hot summers with a short and uncertain rainy season (see p. 240)—and in its type of agriculture (wheat and other ‘dry’ cereals, as distinct from rice cultivation). These aspects are discussed in later chapters. It has, however, a certain unity also in its physical characteristics, with which this chapter is primarily concerned (Figs. 17, 18).

Its physical history has been quite different from that of China south of the Tsinling shan (see p. 24). It has been a continental area since the end of Palæozoic times. As a land-mass consisting of older and harder rocks, it has to a large extent resisted the folding movements which have corrugated the softer and younger marine sediments of much of Central and South China. It has yielded to the stresses and strains of the later earth movements mainly by large scale faulting and fracturing, and by the foundering or subsidence of extensive areas. Hence its most characteristic major land-forms are great tabular plateau blocks, impressive fault-scarps and sunken troughs filled with recent alluvium. This generalization applies also to Manchuria as well as to North China.

The soils of North China are also distinctive (see p. 174). The famous loess or yellow earth as a *primary* deposit is mainly limited to the north-western plateau of Shansi, Shensi and Kansu, but much of it has been carried by stream action on to the great plain of North China where, under the name of *secondary* or *redistributed* loess, it is

intermixed with river alluvium. The soils of North China, as a whole, tend to be light and sandy and, in contrast to the sub-tropical south, with its heavy rains, they have not had their most valuable constituents washed out.

The Central Mountain Belt is most conveniently dealt with in connection with North China, though its importance is primarily as a divide and a barrier. Accordingly, North China may be divided into the following regions (Fig. 15) :

- (A) The Shantung Uplands
  - (1) The Western Upland
  - (2) The Weihsien Valley
  - (3) The Eastern Upland
- (B) The North China Plain
  - (1) The Middle Plain
  - (2) The Hopeh Basin
  - (3) The Basin of the Lower Hwai ho
- (C) The Loess Plateaux
  - (1) The Shansi Plateau
  - (2) The Peking Grid
  - (3) The Shensi Basin
  - (4) The Wei ho Valley
  - (5) The Kansu Corridor
- (D) The Central Mountain Belt
  - (1) The Tsinling shan
  - (2) The Tapa shan
  - (3) The Upper Han Valley

#### (A) THE SHANTUNG UPLANDS

##### *General Features*

This is the term applied to two considerable hill masses situated to the east of the Grand Canal and south-east of the modern course of the lower Hwang ho, where it flows north-eastwards to the Gulf of Pohai. The more easterly of these two masses forms the wide Shantung peninsula and projects far out towards Korea, between the Gulf of Pohai and the Yellow sea. The more westerly rises abruptly from the alluvium of the North China Plain on the north and west and more gradually from the Hwai river plains on the south where outlying hills occur ; on the south-east it, too, is bordered by the Yellow sea. These hill masses are detached fragments of the ancient nuclear core of China, and have their counterparts in the massifs of Korea and of the Liaotung peninsula in southern Manchuria, from which they are now separated by the shallow Yellow sea and Gulf of Pohai respectively. In comparatively

recent geological times the hill masses of Shantung probably stood out as islands in these seas; they are now surrounded by alluvium on their landward side as the result of the rapid accretion

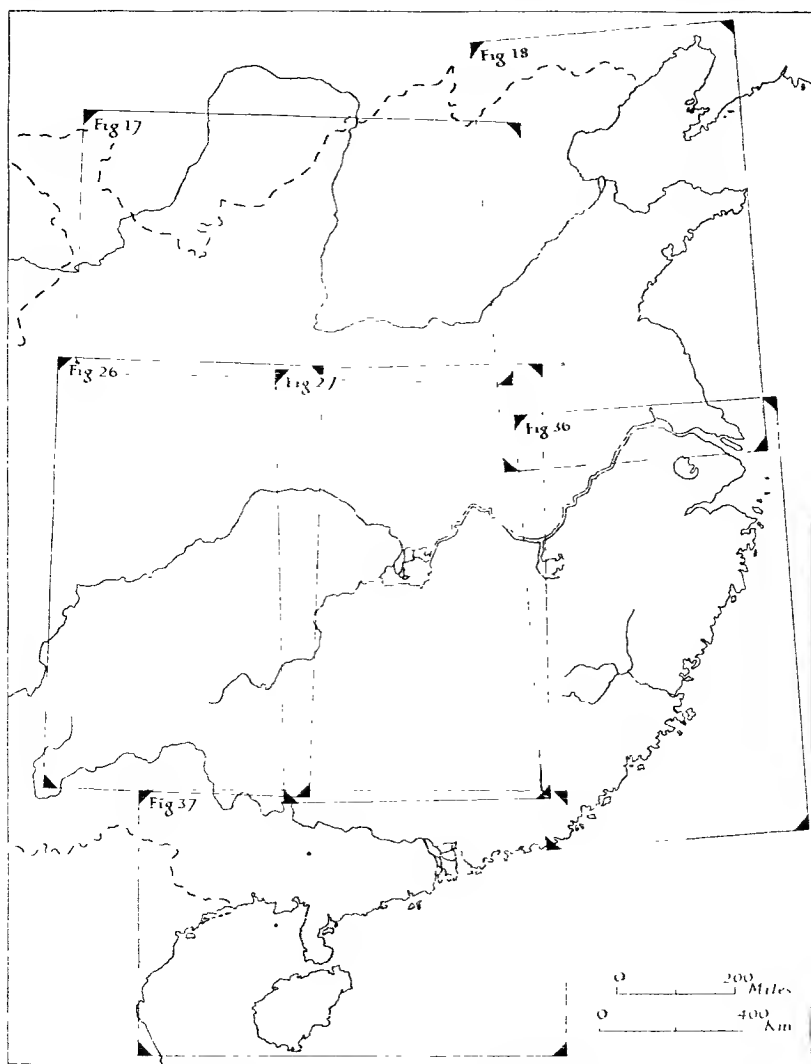


Fig. 16. Index to maps of physical features

of the Hwang ho plains. Their geological structure is complex, and they have been affected by the various mountain-building movements of eastern Asia. In general, their core is composed of hard



archæan rocks with intrusive granite, and their flanks are composed of Palæozoic and later sedimentary rocks, including two coalfields in Jurassic strata near Weihsien and Poshan respectively, on the northern margins of the western massif. Although essentially similar in their physical history and structure, the two masses present rather different characteristics (Fig. 18).

Between the two uplands runs a broad alluvial depression about fifty miles wide and nearly a hundred miles long, extending from Laichow wan in the Gulf of Pohai to Kiaochow wan in the Yellow sea; to this central lowland or corridor several names have been given of which the best known is the Weihsien valley.

Accordingly, three main divisions of the Shantung Uplands may be distinguished; these are (1) The Western Upland, (2) the Weihsien Valley, (3) the Eastern Upland (Shantung or Kiaotung peninsula).

### (1) *The Western Upland*

The Western Upland is the more extensive and contains the highest peaks. It falls broadly into two divisions:—

(i) A mountainous northern section, consisting of three irregular but wall-like and connected chains running west-east and known as the Tai shan, Lu shan and I shan respectively, which interrupt communications between northern and southern Shantung for a distance of over 120 miles. The granitic Tai shan range (Plate 8) dominates the plain to the west, and its highest pinnacle, the most celebrated of the Five Sacred Mountains of China and for thousands of years a great resort of pilgrims, reaches a height of 5,000 ft. just above the city of Taian. The general elevation of these chains is from 1,300 to 3,000 ft., but numerous peaks rise above this level—‘the whole mountain mass has been reduced to a wall which is crowned by pinnacles that stand like towers of a ruined castle’.

Except for a sparse vegetation of grass, low shrubs and occasional conifers, the hills are essentially bare with extensive areas of hard rock surface. The soils are thin and poor, and subject to devastating erosion in heavy rainstorms. Springs, however, occur at the northern and western bases of the hills where limestone outcrops. A famous lake, supplied by limestone springs in the city of Tsinan, is the source of the one navigable river of Shantung province, the Siaoching ho; this ‘small river with pure water’ flows east-north-east parallel to the Hwang ho into Laichow wan, and it enables junks to reach the capital city of the province. The western drainage is to the Grand Canal.

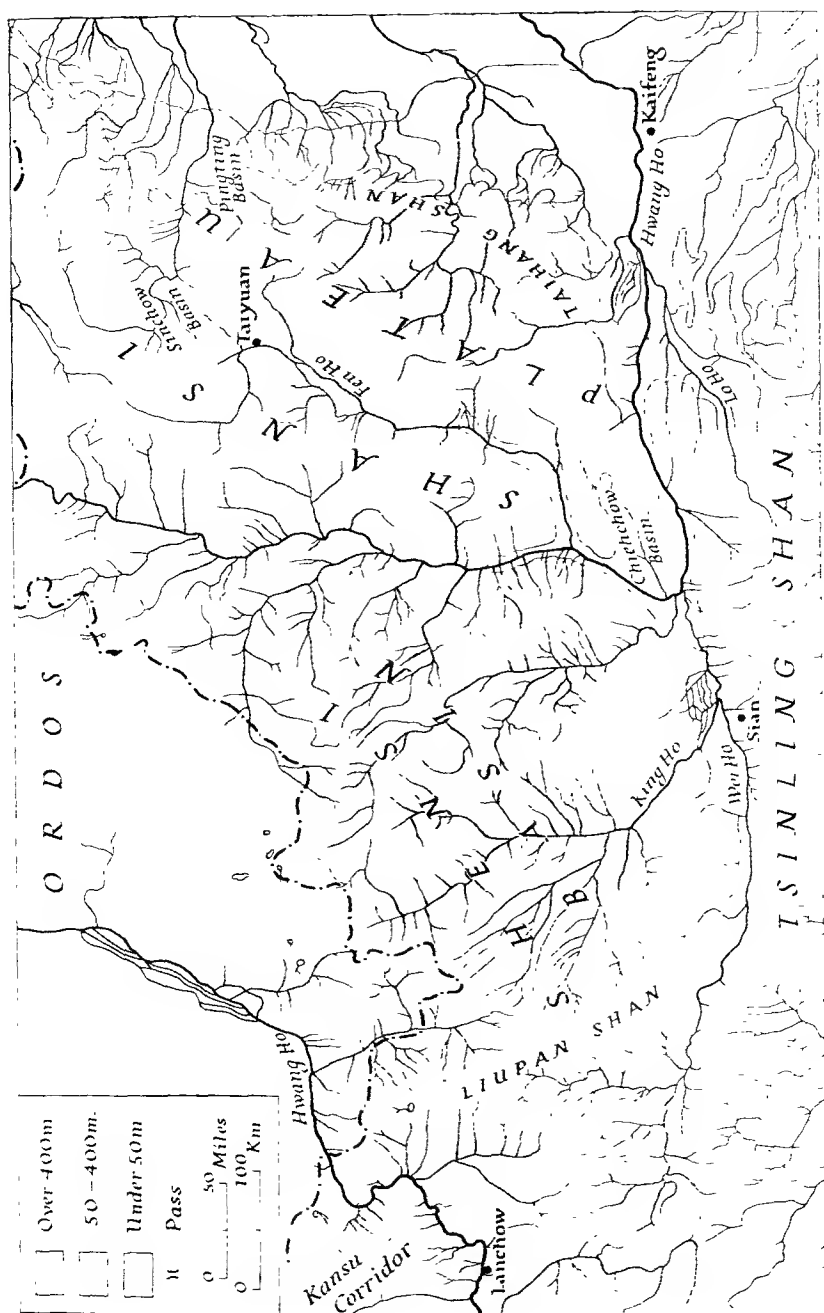


Fig. 17. The Loess Plateaux  
Based on *New Atlas of China*, plates 21, 23, 27, 29 (Shanghai, 1934).

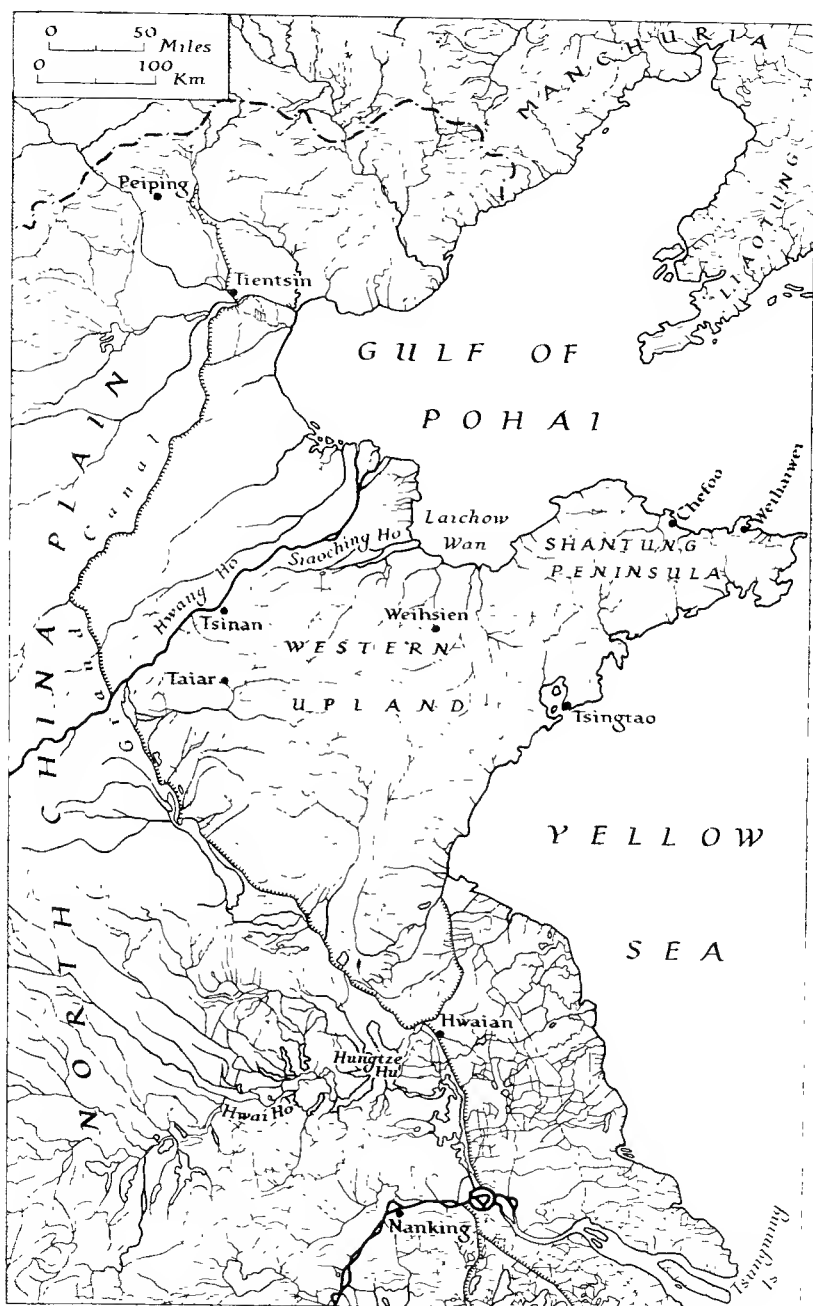


Fig. 18. The North China Plain and Shantung  
Based on *New Atlas of China*, plates 17, 23, 25, 29, 31 (Shanghai, 1934).

(ii) A lower, more open and diversified southern section, hilly rather than mountainous, which is drained by fertile valleys, such as those of the Tungwen ho system, which widens out southwards into the marshy plain east of the Grand Canal. Near the head of one of these valleys is Kufow, the home of Confucius and the scene of one of the two most celebrated temples to his honour, the other being in Peiping. Its association with both Confucius and Mencius gives the Shantung hill country great prestige among the Chinese.

### (2) *The Weihsien Valley*

This broad and fertile, though rather marshy lowland, lies between the two upland masses, and is drained to both the Laichow and Kaiochow bays. The water-parting is so indeterminate that there is no break between streams flowing to the north and south respectively. The lowland is continued westward without a break into the North China Plain, and along the coasts there are extensive areas of saline alluvium of little value for agriculture.

The lowland is densely peopled and is of great value as a routeway. Through it runs the railway, of great strategic and economic importance, from the first-class port and naval base of Tsingtao on Kiaochow wan, to Weihsien, where it is joined by the north coast route from Weihaiwei and Chefoo. Thence it runs westwards along the northern edge of the western upland to Tsinan, the capital of Shantung, and connects with the trunk Tientsin-Pukow Railway. With this it links the Weihsien and Poshan coalfields, which are the most important in the province (Plate 10).

### (3) *The Eastern Upland*

The Eastern Upland or Shantung peninsula is considerably lower in elevation and is in general below 700 ft. It has a very irregular surface of round-topped hills alternating with small basins and plains. There are, however, several igneous intrusions which form hills, one of which reaches 3,500 ft. On both the northern and southern coasts there is a series of crescentic plains, separated by hills which reach the sea as promontories. In contrast to the generally barren character of the interior hills, these plains are intensively cultivated and some of the adjacent hillsides are terraced.

The area available for agriculture probably covers about one-fifth of the total surface of the region, and the crops are similar to those

of the valleys in the western upland and of the Weihsien corridor—wheat, millet, beans and kaoliang, a giant millet which reaches a height of 10 to 15 ft. The milder climate of this maritime region, however, allows of some specialization in fruit production. On the low hills around Chefoo there are some famous vineyards, and the landscape around Weihaiwei is faintly reminiscent of the Mediterranean, with terraces on the gentler slopes above the sandy beaches and scattered pines on the eroded higher parts (Plate 9).

Agricultural poverty in this part of Shantung is relieved by opportunities for fishing and employment in the mercantile marine. Some of the ports, such as Chefoo and Weihaiwei, apart from their commercial and strategic value, are well known for their comparative coolness in summer and are popular health resorts.

## (B) THE NORTH CHINA PLAIN

### *General Features*

The North China Plain is one of the most clearly defined regions in the country and covers an area considerably larger than that of Great Britain. On the east, it reaches the sea except for the break caused by the Shantung Uplands. On the north, it is gradually restricted by the north-eastward trend of the ranges of the Peking Grid, and ends at Shanhaikwan where the Great Wall descends to the sea; only a very narrow coastal plain connects it with the Manchurian lowlands. Its western limit is the Taihang shan, the steep escarpment of the Shansi plateau, clearly visible from the Peiping-Hankow railway. The escarpment is broken by a number of deep valleys carrying streams to the plain, and the most southerly and greatest of these is that of the Hwang ho west of Kaifêng. Here occurs the vitally important extension of the plain between the Shansi plateau and the Tsinling shan towards the Tungkwan gorge which, from time immemorial, has been the chief route to and from the west (Figs. 17, 18).

The eastern Tsinling shan and the Funiu shan delimit the plain on the south-west, but between the latter and the Hwaiyang shan, which trends to the south-east, is the wide gap or gate of Hsiangyang, one of the chief passage ways between North China and the Yangtze. The Hwaiyang shan rises to over 3,000 ft., and is a considerable barrier; but to the east of it, only scattered hills occur, and the northern plain merges into the Yangtze delta. This south-eastern section, drained by the Hwai and its tributaries, has a different soil

character from that of the rest of the North China Plain, and its climate and type of agriculture approximate to those of the lower Yangtze valley. The basin of the lower Hwai ho is regarded as a distinct sub-region, though on the whole it is best to think of it as a transitional zone.

The North China Plain is formed by alluvium and redeposited loess of great depth. As the Hwang ho and other rivers have migrated over the plain and flooded vast areas (Fig. 12), the abundant detritus brought from the Loess Plateaux and beyond has been laid down. The frequent floods may change the character of the soil in a few days; a farmer may find a harvest of stones over his rich

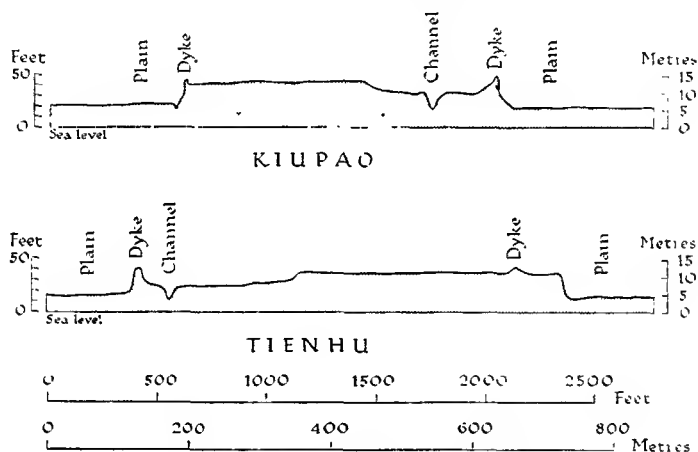


Fig. 19. Sections across the Hwang ho

Based on Cressey, G. B., *China's Geographic Foundations*, p. 158 (New York, 1934).

The river bed is filled with alluvium and loess and thus gradually built up above the level of the plain. In winter, the channel alone is usually filled with water, but in summer, flood waters may reach the dykes and even break through them to flood the plain beyond.

fertile silt or the converse (see p. 31). The depth of the alluvial deposits is at least greater than the deepest wells for no solid rock has been reached in wells 2,870 ft. deep at Tientsin, 2,360 ft. at Peiping and 1,660 ft. in west Shantung (Plate 11).

The river bed of the Hwang ho lies between dykes above the level of the plain (Fig. 19), and for the last 435 miles of its course it receives no tributary of any consequence except part of the flood waters from the Grand Canal. In this way it abandons in the lower part of its course its natural functions as a master river so that a large

number of small rivers flow independently across the plain. The Hwang ho is on the plain but not of it. During the dry winter the river flows in a narrow channel which is cut in the silt; in summer it spreads to the dykes which are all too easily breached by floods or broken in times of civil disturbance and war.

The alluvium is of varied quality and is most widely developed north of  $36^{\circ}$  in the river basin of Hopeh. Farther south, redeposited loess rather than alluvium is the main constituent of the surface, especially in the central portion of the plain between the Tungkwan gorge and the Shantung Uplands. It occurs, however, in various forms and is sometimes interbedded with alluvial material of all kinds, including gravel, sand or clay. At the base of the Tai shan range in Shantung, striking terraces of redeposited loess mixed with gravelly alluvium occur (Plate 8).

The loess generally has a level surface, but it is easily cut by gullies even in the plains. Many of the terraces are probably the remnants of large and level loess areas which have been dissected by small streams. These begin in gullies, and their valleys are rapidly widened by the quick erosion of the steep sided cliff-like walls of loess on either side (see p. 197).

There are also in the North China Plain some sandy and infertile areas, resembling sand heaths in England, with poor and ill-defined drainage. Other areas are swampy, especially in low-lying hollows where the water table reaches the surface during the wet season. Here, the soils consist of clay or clay loams and can be used for crops, if at all, only by planting in autumn and harvesting before the summer rains. Saline alluvium occurs widely along the coast and in quite extensive areas inland. These have sometimes been reclaimed, but the coastal areas present particular difficulties and are generally sparsely peopled (Plate 12).

Much the most important use to which they are put is for the evaporation of sea salt in pans, thickly clustered from the Gulf of Pohai to eastern Kiangsu, especially south of the Shantung Uplands (Fig. 20). Sea water is led through the main dyke by feeder canals and pumped into salt-pans by treadmill or windmill. The industry is at its height in spring and early summer and again in autumn. Over a wide area the bare and open landscape is broken only by stacks of dingy white salt and clumps of workers' huts or by a forest of junk masts on a transport canal. This coastal strip probably contains more salt evaporation pans than any other area in the world, and has always been China's main source of salt. Its loss,

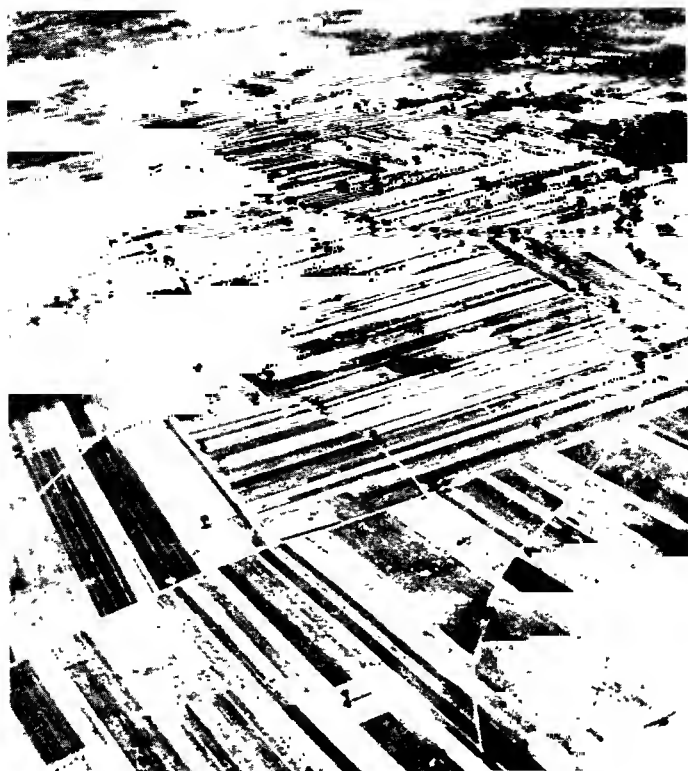


Plate 11 Aerial view, North China Plain

The intensive cultivation is typical of the greater part of the Plain.



Plate 12 Canal near Taku, Hopeh

The marshy area near the coast is partly drained by canals which help to combat the flood menace





Plate 13. Plain and hills near Peiping

This winter scene shows fields near the limit of the North China Plain, with the Western hills in the background.



Plate 14. Ricefields near the Summer Palace, Peiping

Ricefields, here seen flooded, are unusual in North China.

as a consequence of the Japanese invasion, has led to important developments in the production of rock salt in the Red Basin of Szechwan (Plates 18, 41).

In spite of its essential unity the North China Plain is by no means uniform in its surface conditions and considerable regional

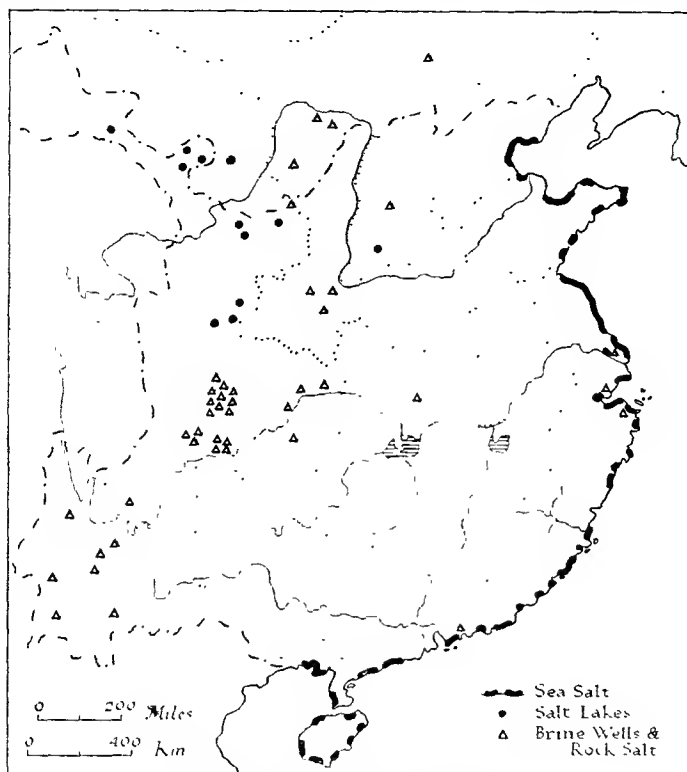


Fig. 20. Areas of salt production

Based on Spencer, J. E., 'Salt in China', *Geographical Review*, vol. xxv, p. 356 (New York, 1935).

Eastern Kiangsu is one of the major production areas, but salt is widely produced in China, both along the coasts and inland.

differences occur. It may be appropriately divided into the following sub-regions: (1) the Middle Plain, (2) the Hopeh Basin, (3) the Basin of the Lower Hwai ho.

#### (1) *The Middle Plain*

This lies between the Taihang shan and the Shantung Uplands, and is the richest and most fertile part of North China. The land

stands at a slightly higher elevation than does the Hopeh basin to the north or the basin of the lower Hwai ho to the south-east, and its soils are predominantly of redeposited loess, calcareous in character. This was the heart of the culture-area of the earliest China, the *Chung-yuen* or Middle Plain, and its modern importance is reflected in its exceptionally high density of population. Part of it is subject to the floods of the Hwang ho (see p. 31), but, however destructive their immediate results, their cumulative effects through the deposition of silt are often beneficial. Even in this area, however, fertility is not universal, and a chain of small lakes and patches of saline alluvium, indicating former swamp conditions, separate the particularly fertile belt on the western margins of the Shantung Uplands from the main nucleus.

The southern portion of the Middle Plain covers the area drained by the waters of the upper Hwai ho and its tributaries, which flow through very gently rolling loesslands about 100 to 150 ft. above sea level. Some of the rivers have built wide flood-plains in these loesslands, and in some localities the land between the rivers has a hilly appearance which is due solely to the dissection of the plain. All this area, which lies in south-east Honan and north-west Anhwei, is intensively cultivated and densely peopled. The crops grown in the valleys of the northern tributaries of the Hwai are similar to those of the North China Plain as a whole.

## (2) *The Hopeh Basin*

This comprises the northern portion of the plain and differs from the Middle Plain in the higher proportion of saline alluvium, as distinct from calcareous loess, and in the relatively large extent of land which is either too water-logged and marshy or too sandy for cultivation, except by special treatment. Such is the general character of the coastal zone round the Gulf of Pohai from the edge of the Shantung Uplands to the neighbourhood of Tientsin. Much of it is devoid of habitation except for the mud-huts of fishermen. The actual delta of the Hwang ho is deserted and the various distributaries are so encumbered with silt as to be of little value for navigation. Uncertainty attaches even to the exact position of the coast but the approximate changes over a period of eighty years may be seen in Fig. 21.

Inland from this desolate coast, much of the saline alluvium and many sandy tracts have been reclaimed in recent times. The landscape is eloquent of harsh and unremitting toil comparable with

that of Flanders. In tiny patches, resembling gardens rather than fields, are grown such crops as kaoliang, maize, soya beans and cotton. The poplars and willows which surround the villages, usually built on slightly higher ground, make them stand out as green islands in the treeless plains (Plates 11, 15). West of the railway from Tientsin to Pukow, calcareous loess again appears, the quality of the soil improves, and intensive cultivation is continuous over a wide area. Peiping, in the northern embayment of the plain, stands near the apex of this richer belt (Plates 13, 14).

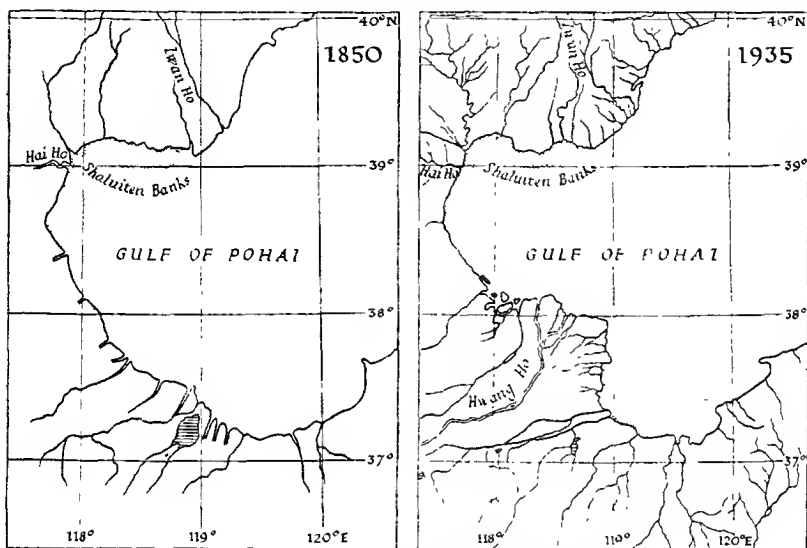


Fig. 21. Gulf of Pohai, 1850 and 1935

Based on (i) a British Admiralty Chart for 1850 map ; and, (ii) *New Atlas of China*, plate 25 (Shanghai, 1934) for modern map.

The 1850 map, though from an inadequate survey, shows the position before the Hwang ho shifted its course northwards in 1853 (Fig. 13). The additions over a period of eighty years can be seen in the right-hand map.

The major physical problem of Hopeh concerns the control of the numerous rivers converging at Tientsin to form the Hai ho, whose drainage basin covers an area of 88,000 square miles. Many of these rivers originally had independent outlets but were conducted to a common outfall in order to facilitate the construction of the Grand Canal as the route for the transport of tribute rice from the Yangtze provinces to the Imperial capital at Peking. The resulting congestion of waters in the hinterland of Tientsin is one of the

factors in the flood problem. Some of the older courses of the rivers are by no means dry, and their present channels are maintained only by earthen dykes which frequently break at high water. The rivers originate in the loess-covered uplands to the west, and, on reaching the plain, they tend to build up low alluvial ridges which often unite to enclose shallow basins containing semi-permanent lakes. Swampy plains and shallow lakes of varied extent, fed by flood waters, characterize much of southern Hopeh and the hinterland of Tientsin. In winter they may be frozen for

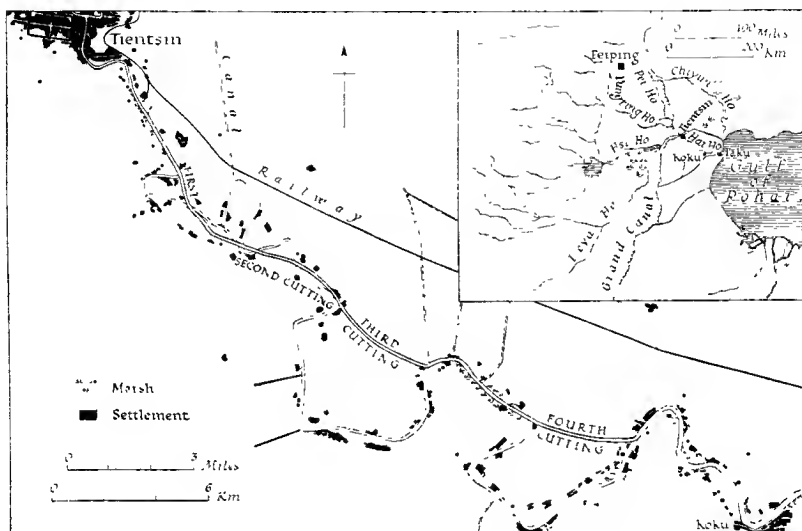


Fig. 22. The Hai ho, from Tientsin to Koku

Based on (i) British Admiralty Chart No. 2654 (1939); and inset on (ii) *New Atlas of China*, plates 23 and 25 (Shanghai, 1934).

The main cuttings are seen together with the meanders of the river.

several months, and the flood waters may take two or three years to reach the sea. In years of moderate rainfall the lakes act to some extent as reservoirs, but floods of catastrophic proportions occur on an average every six or seven years. The flood of 1924, for example, inundated 11,500 square miles of land and entirely destroyed the crops grown on the greater part of this area; about a million and a half people were driven from their homes, and the city and port of Tientsin were threatened (Fig. 12).

The Hai ho Conservancy Commission, first established in 1898, has done much to improve the drainage at the seaward end of the



Plate 15. Agricultural landscape near Tsinghai, Hopeh

In this part of the North China Plain, south of Tientsin, the prevailing monotony is broken only by grave mounds, by occasional tree clumps and by mud-walled villages.



Plate 16. The Hai ho near Tientsin  
The Hai ho is canalized, but only small ships reach Tientsin.

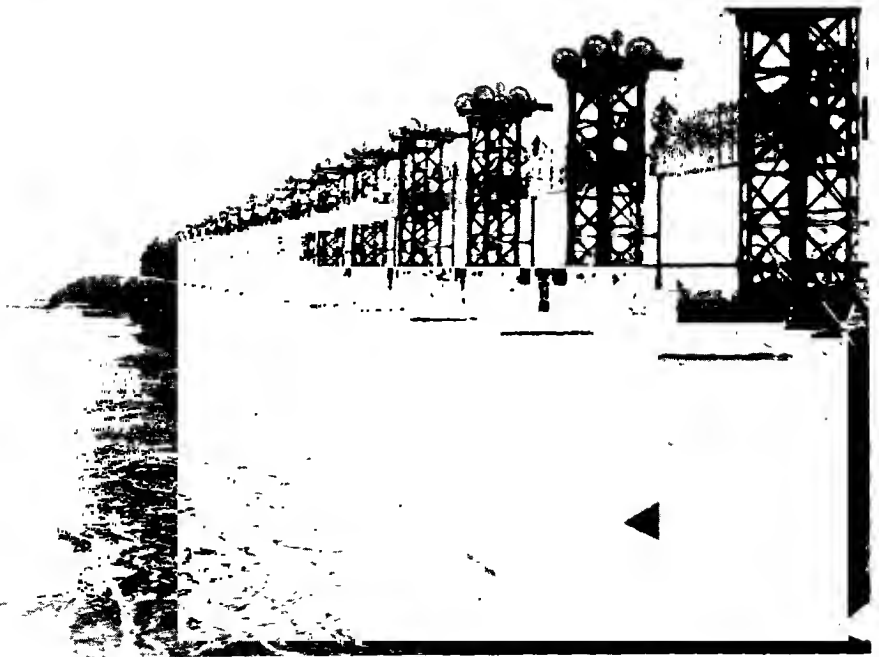


Plate 17. Susua dam on the Pei ho  
This dam near Shunyi, Hopeh, is 690 ft. long, and forms part of a scheme to prevent flooding and soil erosion in the Pei ho basin.

system. The distance between Tientsin and the sea has been reduced from fifty-six to thirty-five miles by the construction of five cuts to eliminate sharp meanders, and this has had the further advantage of clearing some of the bends where ice accumulated (Fig. 22). Dredging of the river to improve navigation, however, cannot obviate the danger of silting caused by the enormous quantity of material which it carries in suspension as a result of the heavy erosion of the loesslands (see p. 33). The effects of a season's dredging may be wiped out in a few hours. In 1931, for instance, the bed of the river was raised by five and a half feet in a few days and on another occasion a deposit of nearly nine feet of silt in forty-eight hours was recorded (Plate 16).

The ultimate solution of all these problems would be to deal with the rivers from source to mouth, and this is what the North China River Commission was endeavouring to do in the years preceding the Japanese invasion. The crucial problem is to distribute the silt where it is wanted and to prevent it from choking the main outlet at Tientsin. There are many areas in Hopeh which would benefit from a layer of silt. For the most part they lie outside the dykes and below the present levels of the rivers. Flooding would be diminished by control of the rivers and re-distribution of the silt. Granted stable political conditions and available capital after the war, there is likely to be extensive land reclamation in Hopeh and western Shantung which may reduce but cannot remove the intense pressure of population on the essentially precarious means of subsistence in this part of China (Plate 17).

### (3) *The Basin of the Lower Hwai ho*

The Basin of the Lower Hwai ho, which comprises the southern and south-eastern sections of the North China Plain, presents conditions and problems rather analogous to those of the Hopeh basin. Its northern boundary may be fixed where the tributaries, which have almost parallel courses from north-west to south-east, are gathered into the main stream of the river trending approximately west-east. Here, the calcareous alluvium is rather abruptly replaced by heavier soils of a loamy or clayey character, deficient in lime, and utilized mainly for rice during the summer season. This is the zone of transition from the 'Wheat Region' of North China to the 'Rice Region' of South China, and it marks the threshold of the Yangtze valley type of soil, climate and rural economy.



Studded with lakes and swamps, the region is, on the whole, very marshy and thinly peopled, difficult of access and hard to cross except by the waterways, of which the Grand Canal, for many centuries the historic route between north and south, is far the most important. Except for this link, it still remains a borderland, and, until quite a late stage of Chinese history, was a definite barrier to colonization, inhabited by aboriginal tribesmen known as the 'Hwai barbarians'.

The Hwai has long presented a most difficult problem. The usurpation of its original channel by the Hwang ho on its southward migration of the twelfth century (see p. 33) increased the complexity of a region already studded with lakes and marshes. Until recently the Hwai had no direct outlet to the sea, but lost itself in marshes and lakes, the Hungtze hu being the most important. This shallow lake, of considerable size in summer but in winter tending to become a marsh intersected by narrow, winding channels, receives most of the Hwai drainage, and acts as a reservoir controlling the flow. Some of the surplus water drains off to the Paoying hu and Kaoyu hu, but most of it reaches the Grand Canal which functions as a major river. As such, it is subject to the silting common to all the North China rivers. The whole drainage system is unable to deal with the flood waters caused by heavy summer rains, and no part of China is subject to more frequent and disastrous inundations. Thus, in 1931, some 34,000 sq. miles were flooded in the Hwai-Yangtze area, and of this one-half was in the Hwai basin, while in 1911 13,000 sq. miles were inundated in northern Anwhei and Kiangsu (Fig. 31 and Plates III, 112).

Shortly before the Japanese invasion, the cutting of a direct channel to the sea for the Hwai had been virtually completed, and this was part of a much larger programme for the development of the lower Hwai basin. It included the drainage of the Hungtze hu and neighbouring lakes, and the reconditioning and deepening of the partially derelict Grand Canal so as to make it a first-class waterway from the Yangtze delta to North China. These projects are likely to be given priority in the programme of public works initiated by the Chinese Government after the war. Under favourable conditions, the lower Hwai basin, a region comparable in size to Belgium, may become one of the most productive parts of China.

The coastal plain of eastern Kiangsu, lying between the Grand Canal and the sea, may be considered as an eastward extension of the basin of the lower Hwai ho. It is protected from the sea by

embankments which provide useful tracks for wheelbarrow and cart traffic. Roads are almost unknown, but the creeks and waterways serve for boat and tug transport and also for irrigation so that it has some of the characteristics of the Yangtze delta with which it is closely connected. In the years before the war, large-scale reclamation of the salt-impregnated and reedy marshes on the seaward side of the main dykes had been carried out. The reclaimed land was devoted almost exclusively to the cultivation of cotton in the hands of large land-companies and big commercial estates, and it had become one of the most highly specialized of the new agricultural districts of China. The physical security of the belt depends both on keeping the sea at bay and protecting it from the overflowing waters of the Hwai. Apart from its agricultural resources, east Kiangsu, as already noticed, is one of the most important areas of sea salt production in China (Fig. 20 and Plate 18).

The southern part of this region is linked by the Grand Canal and innumerable creeks with the lower Yangtze, but for the trade of the northern section a new port has been constructed at Laoyao (see p. 164).

### (C) THE LOESS PLATEAUX

#### *General Features*

The Loess Plateaux region of north-west China is much more complex than the North China Plain. It contains a variety of structural features, basins and bare mountain ranges as well as true tablelands. The loess or yellow earth, which overlies both the lower hills and the valleys, gives it a certain unity of character and a marked distinctiveness from all other Chinese regions of comparable elevation. Beneath this superficial cover of loess occur some of the richest coal-bearing formations in the world. Shansi and Shensi which, together with Kansu, comprise the greater part of the region, contain more than four-fifths of the estimated coal resources of China and are of great significance in its industrial future (Fig. 17).

The steep scarp of the Taihang shan, which rises sharply from the plain to heights of 6,000 ft., is the clear eastern boundary of this region. Its southern limit is the great trough at the foot of the Tsinling shan, followed from west to east by the Wei ho and the Hwang ho, which continues the alignment of its tributary below Tungkwan. The line of the Great Wall defines the region on the north, for this separates the true loess of the

plateaux from the sand-dunes characteristic of the Ordos on the Mongolian side of the historic frontier, and it also marks the limits of effective monsoonal rains. To the north-west, however, the loess of the plateaux is continued through northern Kansu into the long tongue of the province known as the Kansu corridor, between the foot of the Nan shan and the desert. This is the vital road to Turkestan, and access to it from the Wei ho valley is by way of Lanchow, at the crossing of the upper Hwang ho (Plate 28).

### *The Loess*

Common to all these varied terrains and imparting many similar features to their landscape is the mantle of fine yellow earth which the Chinese know as *hwangtu* but which Europeans call by the German name of loess. Modern investigation has upheld Richthofen's contention that it is essentially a wind-borne deposit, principally derived by erosion of the desert regions to the west and transported by the intensely strong north-westerly winds which prevail in this part of China throughout the winter half-year. The Gobi desert region of Mongolia is believed to have been the original source of material, but its rocks over large areas have now been swept bare of soil, and elsewhere present a gravelly pavement which resists erosion. The Ordos, with a much larger proportion of loose material, especially in the vicinity of the alluvial deposits of the Hwang ho with its many deserted meanders, may be an important secondary and later source of supply, which has been increased by modern Chinese attempts to plough up sandy grasslands on the borders of the desert. Thus the heavy contemporaneous erosion of the original loess deposits on the plateaux themselves by both wind and water is to some extent compensated by fresh supplies during the winter, although these imply disaster to the new regions of cultivation farther west.

The loess blankets hills and valleys alike, which is one of the evidences of its æolian origin, but the higher mountains rise above it and the thickness of the mantle varies greatly in different parts (Plates 19, 26). The maximum thickness fully authenticated seems to be under 350 ft., and underlying clays and sands, which were formerly reckoned as loess and led to greatly exaggerated estimates of its depth, are now known to have a different origin. Over a large part of south-east Shansi it is comparatively thin, but it is very well developed in the central Fên ho basin. Its greatest thickness is in northern Shensi and Kansu, particularly on either side of the

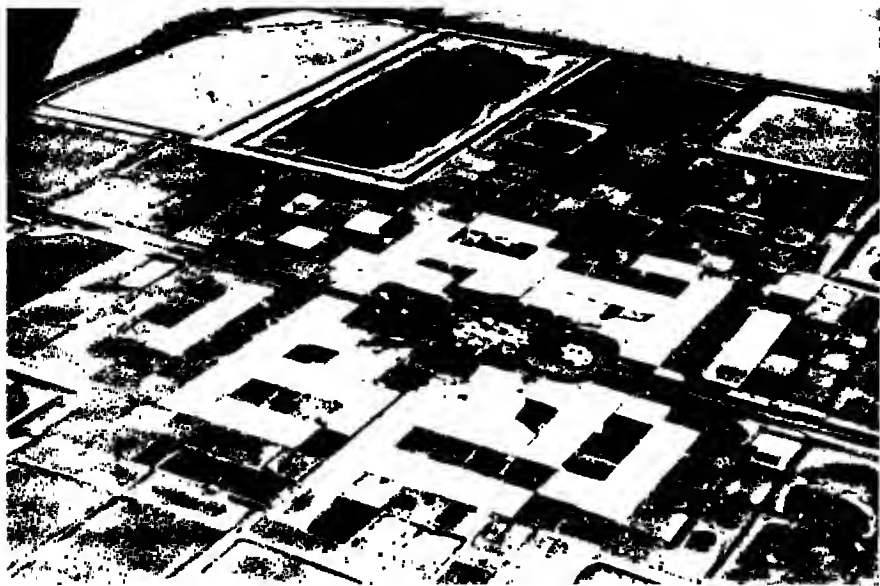


Plate 18. Aerial view of a saltern near Haichow, Kiangsu

Sea water is pumped into the outer pools and as it concentrates is gradually worked towards the centre, where the final product can be seen



Plate 19. Loess country, eastern Shansi

Elaborate artificial terracing conserves the fertile loess soil, here a thin cover over Mesozoic rocks.

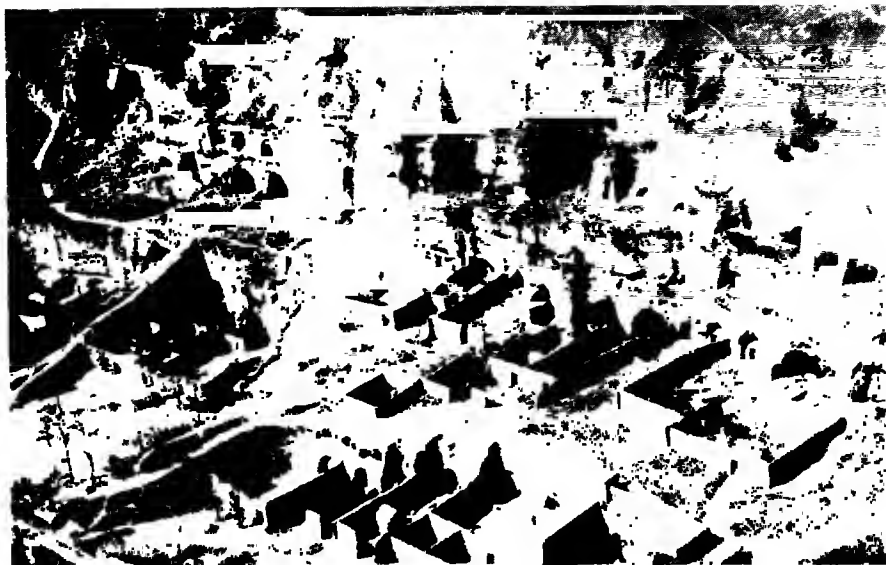


Plate 20. Loess dwellings, Kansu

These caves in the loess between Sian and Lanchow frequently run back as much as 200 ft. Sheep and cattle are kept within the mud-walled yards at night.



Plate 21. Loess dwellings, Shensi

The caves are at two levels in the artificially terraced edge of plateau. A walled village can be seen on the top.

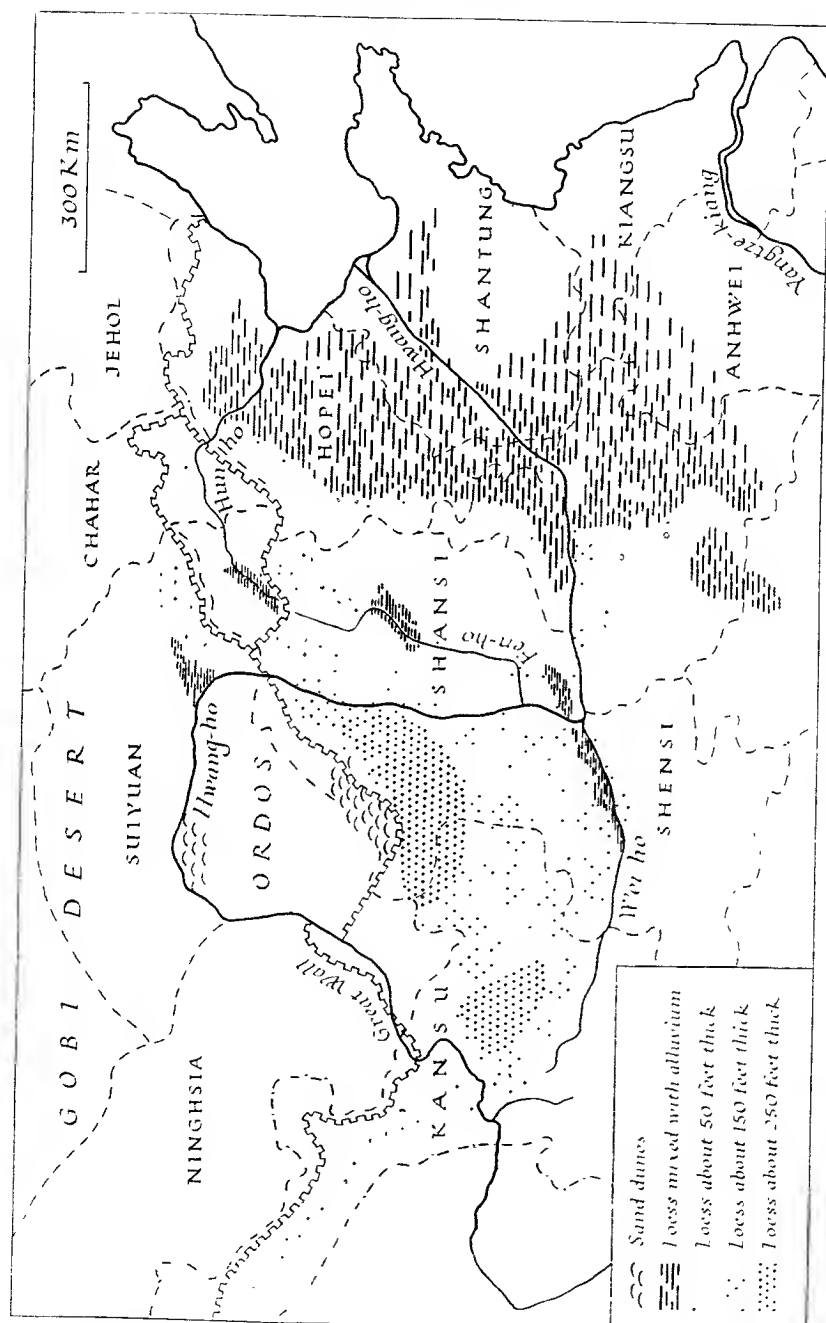


Fig. 23. Distribution of loess  
Based on Cresssey, G. B., *China's Geographic Foundations*, p. 186 (New York, 1934).  
Redeposited loess occurs more frequently on the North China Plain and in some of the upland valleys.

Liupan shan and immediately to the south of the Great Wall where it bounds the Ordos desert. It is of great importance in the Wei ho valley but is abruptly delimited by the Tsinling shan (Fig. 23).

The erosion of the loess, wherever it attains any considerable thickness, produces a most curious and distinctive landscape of vertical walls and deep ravines (Fig. 66). This is the result, on the one hand, of its property of vertical cleavage, and, on the other, of the development of a surface cement which binds together the grains of the upstanding masses. Once established, these cliff-like masses and bridges may stand for years (Fig. 24). Many roads



Fig. 24. Loess dyke, forming divide between two streams

Based on a photograph in Fuller, M. L., 'Some Unusual Erosion Features in the Loess of China', *Geographical Review*, vol. xii, p. 575 (New York, 1922).

The dyke appears to have been built up to some extent; the valley to the left is being very rapidly eroded, that to the right less rapidly. Gashes in the loess are also seen and the vertical cleavage is clearly apparent.

within the highlands are in deep canyons, and it is possible to travel in them for many miles without seeing the countryside at all. Cave-dwellings in the loess are widespread and whole villages are excavated in the sides of vertical cliffs below the cultivated fields. The western part of the region in Shensi and Kansu is subject to occasional earthquakes of great intensity, which may cause violent

landslides, sometimes completely burying these subterranean villages. One such earthquake in December 1920, which occurred during the night, was estimated to have killed nearly 250,000 people in a single district of east Kansu (Plates 20, 21).

The loess was of supreme importance in the early agricultural development of China. It is naturally a very fertile soil and its great porosity makes it unlikely that it was ever heavily forested, although there has undoubtedly been much disastrous destruction of woodland. At the same time it has great capillary capacity so that, given adequate rainfall, the mineral elements in the subsoil are brought within reach of the roots of the crops. Under favourable conditions, the loess is thus self-fertilizing, and its surface is frequently renewed by erosion or by fresh deposits. Thus it presented advantages for primitive cultivators comparable to those of Lower Egypt where the soil was renewed by the layers of silt laid down by the annual Nile flood. The primary loess of these plateaux and the redistributed loess of the North China Plain were the earliest areas of Chinese cultivation and at a very early date irrigation canals were dug to maintain and increase the natural advantages.

Water is indeed essential to the whole mechanism by which fertility on the loesslands is maintained, and the supreme disadvantage of the region is that its rainfall is, from the agricultural point of view, marginal and uncertain. It becomes increasingly precarious to the north-west, so that it is only in the southern part of the loess plateaux—in the Fên ho basin, the Wei ho valley and parts of south-eastern Kansu—that the density of population is at all high. Cultivation is limited mainly to the valleys and the terraced slopes of the lower hills; the exposed, wind-swept plateaux, where there are no facilities for irrigation, are usually bare (Fig. 65). It is generally accepted that the conditions are now more arid than in the early days of Chinese civilization, and that the desert is tending to encroach. On the other hand, many districts are undoubtedly capable of reclamation by well-planned schemes of irrigation and judicious afforestation, and it is noteworthy that Shensi figures very prominently in public works of this character initiated by the Chinese Government during the present war.

Within the region thus broadly defined and which covers an area more than twice the size of Great Britain, structure and topography determine certain clearly marked divisions. The main constituent units of the major region of the Loess Plateaux are: (1) the



Shansi Plateau, (2) the Peking Grid, (3) the Shensi Basin (including eastern Kansu), (4) the Wei ho Valley, (5) the Kansu Corridor,

(1) *The Shansi Plateau*

The great province of Shansi, rather larger than England and Wales together, virtually coincides with an immense plateau block extending from the Taihang shan in the east to the deep gorge-like trough of the Hwang ho in the west. The southern boundary of the plateau overlooks the west-east depression followed by the Hwang ho from Tungkwan to the North China Plain. Except for the folded range of the Luliang shan along its western border, Shansi is essentially an uplifted block plateau with numerous fault-scarps. In the extreme north of the province, however, this type of structure gradually gives place to the folded ranges of the Peking Grid.

The Shansi plateau has been subjected to severe earth strains which have largely taken the form of great fractures and faults with a general north-south or NNE-SSW trend, more or less parallel to the Taihang shan, which is itself the faulted edge of the plateau. The result is a series of tilted blocks with steep scarps and ridges. In the heart of the province downfaulting has given rise to the long depression on the Fên ho valley—in reality a chain of loess-filled basins linked by the valley of the Fên ho. The largest of them lies near the head of the valley in the centre of Shansi, and contains the capital city of Taiyuan. This central belt of rich basins is the economic focus of the province, and is believed to have been under continuous cultivation for forty centuries. Legend associates it closely with the Hsia, the first of the traditional dynasties of China (see p. 302).

The northward continuation of this sunken area is represented by three detached basins—those of Ningwu, Hinhsien and Pingting. These, together with the large upland basin of Tatung, north of the Luliang range, form isolated oases of cultivation set amidst the rugged mountain ranges which dominate the northern third of the province. Here, the plateau form characteristic of the south-east virtually disappears, and the mountains rise above the loess cover, which is almost restricted to the basins.

Shansi's vast coal reserves lie mainly in the south of the province which consists to a large extent of Palæozoic rocks. In the interior, the coal seams are buried under sandstones and loess, but on the eastern side they outcrop in the terraces of the Taihang shan (called by Richthofen 'the anthracite terraces') under conditions



Plate 22. The Western hills near Peiping

The Liuli ho runs through a bare hilly landscape. Persimmons are stored in the reed-covered beds at the left.



Plate 23. Nankow, Hopeh

Nankow lies in a valley of the Peking Grid, on the edge of the North China Plain.



Plate 24. The Great Wall

This section of the Great Wall near the Nankow pass, north-west of Peiping, defends the approaches to the city ; it was rebuilt in the early 15th century (Ming dynasty).

favourable to mining, and accessible from the North China Plain. The main seam has here an average thickness of 18 ft., and iron ores are interbedded below the coal-measures. The Ho shan, a prominent ridge east of and parallel to the Fên ho valley, separates the predominantly anthracitic fields on the west from the predominantly bituminous fields on the east.

Coal mining by primitive methods is of great antiquity in Shansi. Lump anthracite from the 'terraces', as well as pig iron and manufactured iron goods, supplied most of the former needs of North China. Shansi, however, was adversely affected during the initial phases of modern industrialism in China. Under western auspices coal-mining was at first developed nearer the coast, and Shansi province was but slightly connected with the main arterial routes developed in the east. In the future this position will be radically changed. Shansi's coalfields are the most valuable both in quantity and quality in the whole country, and, indeed, are among the greatest in the world. With its high proportion of anthracite, Shansi is potentially to China what Pennsylvania has long been to the United States.

Shansi is a province of marked individuality. Cradled in a stern environment, which has set rigid limits to the expansion of agriculture but which has tended to encourage initiative, its people have taken an active part in external commerce. Shansi merchants, and particularly Shansi bankers, are well known throughout China and far into interior Asia. Its mineral resources, its geographical position and the character and antecedents of its people undoubtedly presage a great industrial future for the province.

## (2) *The Peking Grid*

This term is applied to the remarkable belt of tightly packed mountain ranges trending at first north-east, and then increasingly east-north-east, from northern Shansi along the frontiers of Hopeh and Chahar to the borders of Jehol, which is now included in Manchuria. The expression Peking Grid, first used by Richthofen, is a happy one, for the ranges are cut by a number of valleys leading south-eastwards to the embayment of the North China Plain in which Peiping (Peking) lies. These mountains are exceptional in North China for they belong definitely to the folded type. The physical history of the region is very complex, and some of the oldest rocks in China are involved, as in the Wutai range of northern Shansi which rises to over 10,000 ft. ; this gives its name to a great

pre-Cambrian series of rocks (see p. 471). The present direction and character of the chains, however, seem to have been determined by the pronounced earth-movements of Mesozoic times (see p. 474) which were associated with volcanic interludes; the effects of this volcanism are very apparent in northern Shansi and the borderland of Inner Mongolia. There was further disturbance and outpourings of lava at the time of the great Himalayan movement in Tertiary times when the steep southern and south-eastern edges of the Mongolian plateau were probably formed (Plates 22, 23).

The belt of the Peking Grid is relatively narrow, but it is of great importance because it separates the alluvial plain of North China from the undulating tableland of Mongolia. The alternative name of 'the Barrier ranges', sometimes given to them, well describes their historic role; the local name of 'the Western hills' (of Peking) is also sometimes used to denote the whole belt. They have naturally played a conspicuous part in the defensive system of the Great Wall (or rather walls) whose function was to stem the movement of nomads from Central Asia. As seen today, two arms of the Great Wall encompass practically the whole width of the zone in the section north-west of Peiping. The inner arm or loop follows the scarps of the Nankow ranges adjacent to the plain, while the outer follows the edge of the Mongolian plateau beyond Changchiakow (Kalgan). Many travellers have recorded the striking change of scenery when this outer wall is reached. To the north and north-west stretch the high, bare undulating plains of Mongolia; to the south-east is 'a maze of rugged mountains and precipitous ravines', through which the caravan tracks descend steeply to Peiping 5,000 ft. below (Plate 24).

Historically, this borderland has been debatable ground between Mongol herdsmen and Chinese peasants; but, in recent times, the intermontane valleys and basins have come almost completely under cultivation, and this sometimes extends high up on the mountain slopes; oats have been observed at a height of over 6,000 ft. on those of the Wutai shan. Some of the basins are filled with the deposits of dried up lakes (*tsaidam*), and their rich loams favour cereal cultivation, although the scanty and uncertain rainfall makes arable husbandry precarious unless irrigation is possible.

The most important of all these valley basins is that of Changchiakow, better known under its Mongol name of Kalgan. Here several streams and routes converge, and the town has become the southern commercial gateway of Mongolia, and the chief economic focus of

the border region. Its significance has been greatly increased by the construction of the Peiping-Suiyuan railway, which was the first railway in the whole country to be built entirely under Chinese auspices. After climbing through the Peking Grid to Kalgan, this railway links it with Tatung, the chief basin of northern Shansi and an important source of coal. The railway terminates at Paotow, near the northern Ordos arm of the Hwang ho ; from here the river along both the northern and western arms of the Ordos loop is navigable to Ninghsia and beyond. Railway and river together provide the chief artery for the opening up of what has been too optimistically called 'China's Great North-West'. Beyond the Peking Grid the aridity is too great to permit of agricultural development except in very limited districts, but the pastoral and mineral resources of the area are considerable. Should the railway, as was originally proposed, be continued from Kalgan via the historic caravan route to Urga and then to the Trans-Siberian Railway, North China would be provided with a very important link with the U.S.S.R. and Europe.

### (3) *The Shensi Basin*

The plateau lying to the west of the Hwang ho gorge valley has a quite different structure from that of Shansi. It is not an uplifted block but a basin and is usually called the Shensi basin, although in fact it also extends over eastern Kansu, its western rim being the long and prominent range of the Liupan shan. The Shensi basin, however, is filled up by such a thickness of sediments that its average elevation is almost equal to that of the Shansi block ; like Shansi, too, it is drained and orientated southwards to the Wei ho-Hwang ho transverse valley (Plate 26).

The Shensi basin is closely connected with the Wei ho valley, for the drainage of the basin (a great part of which is actually in Kansu province) is almost entirely southwards to the Wei or Hwang in the famous valley trench between the Loess Plateaux and the towering scarps of the Tsinling shan. The Lo ho, to the east, and the King ho to the west, are the two main arterial rivers which collect the drainage of the basin. Their headwaters are not far south of the Great Wall, which here defines the southern and the south-eastern borders of the Ordos plateau-desert. They have long parallel south-south-east courses. The Lo ho flows into the Hwang ho just above its junction with the Wei, while the King ho flows into the Wei almost opposite the city of Sian.

The lower loess-filled valleys of these two large rivers and their tributaries, which in the case of the King ho are very numerous, have played the same role in Shensi-Kansu as the Fên ho basins in Shansi (Fig. 25); they are among the longest settled and most ancient centres of cereal cultivation in China. Towards the north-west, however, as the Ordos is approached, the rainfall becomes increasingly scanty; semi-desert conditions prevail, and the broken relief makes cultivation difficult. There is here a wide transitional

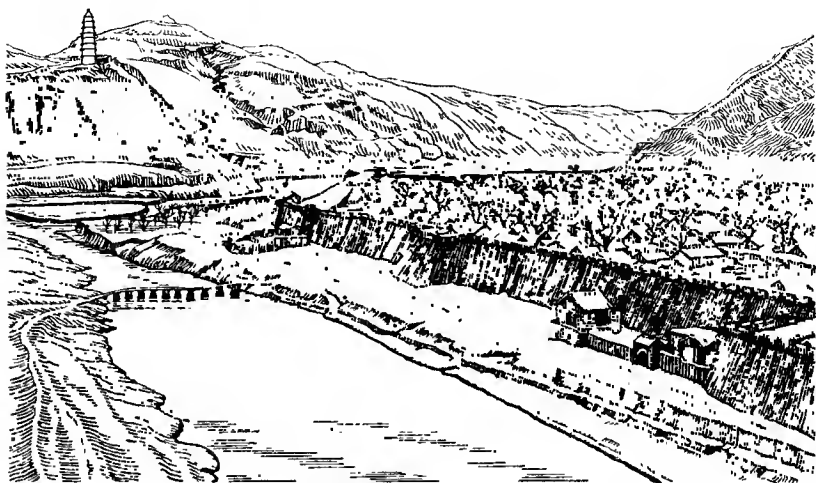


Fig. 25. Yen-an, Shensi

Based on a photograph in Mallory, W. H., *China : Land of Famine*, p. 9 (New York, 1926).

A walled town in a loess-filled valley, which shows the gullying of treeless slopes. The hill-summits have the generally even line of the Shensi basin.

belt between 'the steppe and the sown', from which in ancient China strong frontier states, established in the Wei valley, were able to obtain the roughriders who made their cavalry so formidable. In this dry north-western fringe of China Proper, animal farming assumes exceptional importance, and the number of animals per farm in north-west Shensi and Kansu is nearly three times greater than on the North China Plain. Oxen, donkeys, mules, horses and sheep are the principal animals on these mountain farms.

In spite of its high average elevation, this Shensi-Kansu region is structurally a basin, and its physical history and mineral characteristics have much in common with the Red Basin of Szechwan,



Plate 25. Valley in the Wutai shan, north-east Shansi  
The valley, 5,000 ft. high, lies in the loftiest ranges of the Peking Grid.



Plate 26. Loess country, northern Shensi  
The even plateau surface has deep gullies and abandoned cultivation terraces in thick loess deposits.





Plate 27. An arid landscape in the Kansu corridor

The scanty vegetation is typical of this region, through which routes run from north-west China to Mongolia and Sinkiang.



Plate 28. The walled city of Lanchow, Kansu

Lanchow, on the Hwang ho, commands the southern entrance to the Kansu corridor. The heavily-eroded treeless slopes of the Nan shan appear in the background and numerous grave mounds in the foreground.

from which it is separated by the great fold zone of the Tsinling. In both cases there was a long and deep accumulation of Cretaceous sandstones, and both gypsum and salt are important resources. In both cases, too, there is a potential reserve of petroleum. The observation of oil seepages led to prospective borings in the Shensi basin which have yielded crude oil. But it is not yet certain whether petroleum is present in sufficient quantities to justify the construction of large-scale mining plant. The oil prospects are probably less promising than in Szechwan.

Shensi's most valuable mineral is coal, and its coal reserves rank second to those of the neighbouring province of Shansi in all China. The estimated reserves of Shansi form over 52% and those of Shensi nearly 30% of the total known coal reserves of China. On the whole, however, the Shensi coal measures are less accessible and deeper than those of Shansi. Coal measures of Permo-Carboniferous age crop out along the margins of the basin, particularly on its eastern side, and towards the centre there is a coal horizon of Jurassic age. Only on the margins are the sedimentary rocks folded to any considerable extent, and most of the region is covered by an exceptionally thick mantle of loess. Much of the coal probably lies too deep for profitable mining, and so far it has been worked at only a few points for purely local consumption. Enough may be available to assist the industrial development of the Wei ho valley which lies outside the basin, but no big expansion of the Shensi coalfield comparable to that anticipated in Shansi is expected.

#### (4) *The Wei ho Valley*

The significance of the Wei ho valley both in the past and the future development of China cannot easily be overstated. It forms part of the great west-east tectonic trough faulted down between the Loess Plateaux to the north and the magnificent ranges of the Tsinling shan to the south. The north-south faults of the Shansi plateau are progressively compressed towards the south, until they seem to unite into a single line of fractures, the Wei ho fault, at the base of the Tsinling. It is a fault of enormous extent and displacement, and the Tsinling in many parts presents an immense wall-like front to the valley. Dr J. S. Lee has summarized its significance in the physical evolution of China by saying: 'This fault, or succession of faults, has evidently developed in recent geological times and throws the North China block down against the Tsinling.'<sup>\*</sup> It is

<sup>\*</sup> Lee, J. S., *The Geology of China*, p. 261 (London, 1939).

not surprising that the earthquakes to which the loess plateaux are liable are especially frequent in the Wei ho valley.

The form of the valley is far from symmetrical. Its southern margin is precipitous, but the rise northwards to the Shensi basin is gradual, and the valleys of the King ho and Lo ho carry broad tongues of lowland north-west. The soil of the valley is largely formed of redeposited loess brought down by the northern tributaries and the Wei is a fairly typical loessland river. In places it flows through gorges with vertical walls liable to sudden land slides; elsewhere the cultivated fields stretch continuously from the river to steep cliffs. Occasionally there is a series of natural terraces with dwellings excavated in their sides. Rarely does the river flow on the surface of the plain; usually it is incised in a depression of varying width. The prosperity of the whole plain depends upon irrigation; the necessary water is drawn either from wells or from the Wei and its tributaries. Taken as a whole, however, it is and always has been a region of great fertility and its comparatively sheltered position allows the growth not only of the normal northern crops (maize, barley, peas, hemp, tobacco, alfalfa), but also of cotton, and in certain districts even rice. There is also a variety of fruits and the Wei ho valley is one of the most northerly regions in China in which the bamboo can be grown on a large scale. Sian, the capital city of Shensi province, lies in the most productive part of the region, and east and west of it there is said to be an average of one market town to each square mile over a very wide area.

It is the combination of this fertility with its strategic and economic importance as the one great natural corridor between North China and Central Asia that gives the Wei ho valley such significance. Two of the dynasties that most shaped the development of China in its critical formative period originated in this region, and conquered the country from this base; the second of these (the Ch'in), which first consolidated China in the third century B.C., derived its name from the principality based on the Wei ho valley. The very name of China probably comes from that of this early state. All the earlier capitals of China were placed on or close to this vital thoroughfare from Ch'angan, the predecessor of Sian on the west, to Kaifeng on the east, where it opens on to the plain. Nor is its significance less for modern China. It was the inevitable route for the premier railway from east to west. Already, this Lunghai railway has been carried west of Sian, and is to be continued through the Kansu corridor to Sinkiang and to Central Asia.

(5) *The Kansu Corridor*

The prominent range of the Liupan shan separates the Shensi Basin from the high loess-covered plateau of central Kansu to the west. This range forms the water-parting between the upper Wei ho and the upper Hwang ho. The main route to the west from the Wei ho valley ascends the watershed and then uses tributary valleys of the Hwang ho until it crosses the great river at the important bridge town and market centre of Lanchow, the capital of Kansu province. Lanchow is the threshold to the Kansu corridor which extends as a long narrow salient for over 600 miles to the north-west. The margins of the huge Tibetan massif are defined with unusual precision on its north-eastern side where the buttressing ranges, collectively known as the Nan shan, rise abruptly from the level of the Mongolian plateau to heights of over 17,000 ft. At the foot of these ranges many snow-fed streams descend and provide opportunities for irrigation and settlements before they disappear in the salt lakes of the Ninghsia desert. The Kansu corridor is thus essentially a long, narrow ribbon of oases between the mountain wall and the desert, with numerous towns, some of great antiquity, strung along it (Plates 27, 28).

For more than 2,000 years the Chinese have attached supreme importance to holding this critical highway to Central Asia, and, under the Han dynasty (206 B.C.-A.D. 214), the Great Wall was extended north-westwards to protect it on the desert side. The wall reaches to Chiayükwan beyond the town of Suchow, where a famous stone tablet bears an inscription recording its importance as the outermost bastion of the great military barrier. The total length of the Great Wall from Chiayükwan to its seaward terminus at Shanhaikwan is about 1,800 miles.

The Kansu corridor extends still farther west to beyond Ansi where the highway bifurcates; one branch strikes north-westward across the desert to the important oasis of Hami which is the gate to the roads on either side of the Tien shan; the other branch continues westwards and keeps to the south of the Takla Makan desert along the margin of the Tarim basin. The Kansu corridor is thus the link between China Proper and the great arterial routes of Sinkiang.

The Chinese have long attempted to exploit the agricultural possibilities of the corridor, but the difficulties are great, as many abandoned homes and towns along the road testify. The rainfall is light and the time of its arrival uncertain, and the growing season

is short. Irrigation may give success to cultivation for a time, but the heavy evaporation often brings salts to the surface and leaves a hard crust useless for agriculture. The surface soil when ploughed and exposed is liable to be swept away by the high winds of winter. The fine materials are removed by erosion, and only coarse sand and stones remain. There is, however, sufficient soil and moisture for agriculture to furnish supplies for the traffic along the corridor. From the earliest times the route has been used by armies, traders and pilgrims, and it will eventually be followed by the extension of the Lunghai railway to Turkestan.

#### (D) THE CENTRAL MOUNTAIN BELT

##### *General Features*

This term denotes the series of great mountain chains which project into the heart of China Proper from the lofty Tibetan massif and constitute at once the most formidable barrier and the most important divide in the whole country. In China they have played the same kind of role as the Alps in Europe, and, like the Alps, they are so wide as well as high as themselves to form a major region (rather larger than Great Britain), though one whose chief human importance is of a negative rather than a positive character.

This west-east fold zone, as already stated, is considered as a region of North China for the sake of convenience. Its main constituents are: (1) the Tsinling shan—Funiu shan—Hwaiyang shan on the north, (2) the Tapa shan on the south, two roughly parallel series of ranges, while between them lies (3) the upper Han valley, which is the only part of the region of agricultural importance.

##### (1) *The Tsinling shan*

The main range of the Tsinling, the most imposing and important range in the series, and indeed in all China Proper, apart from the giant ranges along its western border, is a continuation of the axis of the Kun lun mountains of northern Tibet. It enters China Proper on the borders of Kansu and Tsinghai provinces in a region which is still very imperfectly known. The axes of the chains which compose it then run nearly due east through south-east Kansu and south Shensi into central Honan. The abruptness with which the Tsinling rises above the Wei ho valley in gigantic wall-like cliffs has been already emphasized. In the west where it takes off from the Tibetan massif the elevation is probably not less than

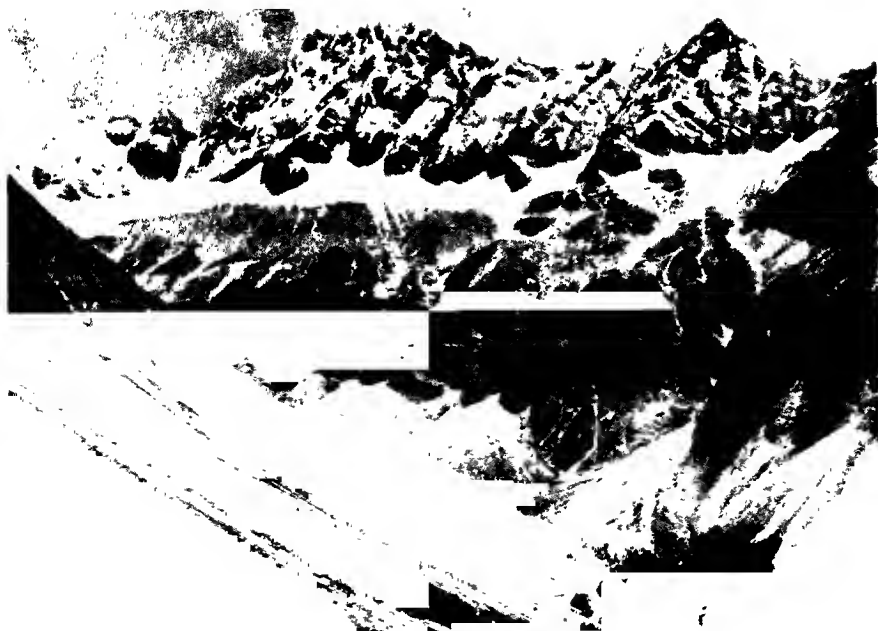


Plate 29 The Tapa shan

These snow-covered peaks in the western Tapa shan show well-developed scree. Alpine meadows immediately above the tree limit are also evident.



Plate 30. The Tsinling shan

The metamorphic limestone ranges of the eastern Tsinling, near the source of the Lo ho, are cut by deep valleys and are densely forested.



Plate 31. Valley in the Tapa shan

This upland valley surrounded by treeless mountains has cultivation on the lower slopes and a walled village.



Plate 32. Ricefields in the Central Mountain Belt

The tree-covered hills and the flooded ricefields show the transition to the humid conditions of Central China.

20,000 ft., but it sinks eastwards to an average height of between 8,000 and 9,000 ft., which is maintained for a long distance in the section south of the Wei ho-Hwang ho trough. Then in Honan, as it approaches the western edge of the great longitudinal depression in which lie the North China Plain and the lowlands of the Central Basin (see p. 18), the axis is significantly displaced to the south-east to form the Funiu shan. This range, which rises to about 8,000 ft., is loess-covered on its lower slopes and, for that reason, is included by some geographers in the region of the Loess Plateaux; it is, however, a direct, although deflected, continuation of the Tsinling shan and serves the same role as a barrier and a divide, so that it seems best to include it in the Central Mountain Belt. From its eastern end there is a sharp descent to an important broad gap known as the Hsiangyang, or sometimes the Nanyang-Hsiangyang gap, which gives access from the North China Plain to the upper Han valley. From this gap eastwards the continuation of the Tsinling belt is bent into the form of an arc, the Hwaiyang arc, with its convex front facing west of south. The Hwaiyang mountains form a divide, as their name implies, between the drainage of the Hwai and Yangtze rivers. In the west they are low and narrow and are here crossed without difficulty by the Peiping-Hankow railway, but farther to the east, on the borders of Anhwei, Honan and Hupeh, they broaden and rise to over 3,000 ft. The final eastern appearance of the Tsinling belt in China is in isolated groups of hills rising above the alluvial plain in eastern Anhwei and the borders of Kiangsu to the north of Nanking.

The Tsinling shan is a very broad as well as high belt of mountains. In the years before the Japanese war it had been fairly extensively studied by members of the Chinese Geological Survey, and its rock composition and character are thus known. Three chief zones can be distinguished, all extending west-east; the northern zone is made up of highly metamorphosed Archæan and early Palæozoic formations, with immense masses of intrusive granite on its southern border; the middle zone is composed of Silurian, Devonian and Lower Carboniferous formations only slightly metamorphosed; the southern zone, which is the broadest of the three, resembles the northern in being intensely metamorphosed, but the rocks which have undergone this transformation seem to be mainly of calcareous and other sediments of Upper Palæozoic age. On the southern side of this metamorphic zone intrusive granite again appears (Plate 30).



The Tsinling has been an extremely persistent zone of disturbance and folding. Its elevation has been usually ascribed to the great earth movements at the end of the Palæozoic, known in Europe as the Hercynian, and there is evidence that at least the northern zone of the western Tsinling was involved in it. Recent work, however, seems to show that later movements in Mesozoic times have chiefly determined the character of the system as a whole; it was also probably re-elevated in the period of the Himalayan movement (see p. 475).

### (2) *The Tapa shan*

The Tapa shan is the other main constituent of the Central Mountain Belt. Its precise tectonic relationship to the Tsinling is not clear, but it diverges from the Tibetan massif not far to the south of the major range and trends east-south-east as a broad high belt which bounds the Red Basin of Szechwan and links up with the Gorge mountains through which the Yangtze cleaves its way into the Central Basin. Considerably lower than the Tsinling, it nevertheless reaches over 10,000 ft. in the west and in isolated peaks farther east. The drainage system is intricate, and a sinuous water-parting divides the streams flowing to the Han from those flowing to the Yangtze in the Szechwan Basin and the Gorge section. The range is virtually bisected by the Kialing kiang. This river rises in the Tsinling shan, flows through the Tapa shan into the Red Basin and ultimately joins the Yangtze at Chungking. The Tapa shan has been less studied than the Tsinling, but is believed to be composed largely of dolomitic limestone (Plates 29, 31).

### (3) *The Upper Han Valley*

Set in between these two great mountain systems is the valley of the upper Han, which is fed by many tributaries from both. Near the important city of Hanchung, one of the most isolated centres of population in China, the valley widens out to a fertile and densely peopled plain, about sixty miles long and twelve wide. It has been compared in position with the much larger Szechwan Basin; at some distance below it, the river Han has excavated a passage through majestic gorges almost comparable to those of the Yangtze when it leaves the Red Basin. This secluded Hanchung basin has its main outlet at Hankow and its climate and type of production are those of Central rather than North China.

*The Central Mountain Belt as a Barrier and a Divide*

It is as a barrier and a divide that the Central Mountain Belt has such great importance. In all but the eastern third of the country it effectively separates the major regions of North and Central China.

As a barrier it has always made contact between both the North China Plain and the Loess Plateaux and the Red Basin supremely difficult. It has limited the movements of armies and the spread of rebellions. It has helped to make possible the distinction, so often seen in Chinese history (see Chapter XI), between a 'Tartar North' and a 'Chinese South'. It arrested the northern movement of the Taiping rebellion in 1860 and the southward movement of the Mohammedan revolt in the north-west in 1875. The most westerly practicable route for armies moving north or south has been by the Nanyang-Hsiangyang gate, just east of the Funiu shan, which has frequently been the critical scene of conflict. Much farther west, however, was one historic courier mountain road from the upper Wei valley by a high pass over the Tsinling to the Hanchung basin, and then over the Tapa shan to Chêngtu in the Red Basin. This is now followed by a modern highway and is the projected route of a railway to link Szechwan with the north-west.

As a divide the Tsinling separates the zone of long cold winters and biting north-westerly winds from that of cool but comparatively open winters, almost frost free in the Red Basin, and of much longer and moister summers. It is similarly a divide between the cool temperate flora of the North and that of Central China with its mixture of temperate and sub-tropical species. The Tsinling, however, has been more of a barrier to the northward migration of sub-tropical species than to the southward migration of temperate species. Associated with the contrast of natural vegetation between the two sides is that of cultivated products and types of rural economy. It is a divide between the 'dry' and the 'wet' cereals, between the 'Wheat Region' and the 'Rice Region', and along with the differences of agricultural conditions goes the contrast of farm animals: horses, mules, donkeys, oxen and camels in the north and water buffaloes in the south. The change in all these respects comes at the Tsinling rather than at the Tapa shan. The traveller from the north first encounters 'southern' luxuriance and rice cultivation when he descends to the Hanchung basin (Plate 32).

In one respect, however, the Tsinling is a less important divide than the Nanling. It is not, as is the southern fold-zone, a major linguistic divide. 'Mandarin', though in somewhat different dialectical forms, is spoken in the Central and Red Basins as well as in the North China Plain and the Loess Plateaux.

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## Chapter IV

### CENTRAL CHINA

Introduction : The Sino-Tibetan Borderland : The Red Basin of Szechwan : The Central Yangtze Basin : The Lower Yangtze Valley and Delta : The Hangchow Basin : Bibliographical Note.

#### INTRODUCTION

Hardly less than North China does Central China form a real geographical entity or major region. It has very definite characteristics of its own which distinguish it from the North and from the different parts of South China. It comprises the whole area between the two great divides, the Tsinling on the north and the Nanling on the south and south-east, and forms more than a quarter of China Proper (see p. 23). Essentially it consists of a series of rich basins, large and small, and of valleys linked together by the wonderful arteries which the Yangtze drainage system provides. The Yangtze itself is the main arterial route, navigable from the western margin of the Red Basin, within sight of the snow mountains on the Tibetan border, to the sea some 1,600 miles away ; its tributaries, the longest of which are comparable to the Rhine and the Danube, converge upon it from all parts of the two divides. The one important river valley independent of the Yangtze system, but within the limits of Central China, that of the Tsientang, opens into Hangchow wan just to the south of the Yangtze delta, and facilitates closer contact between it and the southern half of the Central Yangtze Basin in Kiangsi and Hunan (Figs. 26, 27, 28).

The various basins and valleys thus linked together are often surrounded by hilly and even mountainous country, but the emphasis in Central China, in contrast to the north-west and the south, is on the basins and valleys, which form a large proportion of its total area. Except in the case of the Red Basin, the surrounding highlands are rarely continuous ramparts, and do not offer serious obstacles to connecting land routes. The relative ease of contact is reflected in the high degree of linguistic uniformity ; ' Mandarin ', with some regional variations, is spoken everywhere in Central China except in the Yangtze delta and the Tsientang basin.

The soils of both basins and valleys are, on the whole, richly alluvial, and are intermediate or ' neutral ' in character between the alkaline soils of North China and the acid soils of the mountain areas and of most of the lowlands of South China.

Climatically, Central China has its own very distinctive regime. The winters are cool (four months with a mean temperature of under 50° F.), but not cold and rainless like those of the north. A summer season of humid heat and rather high rainfall is preceded by considerable spring rains. With this well-marked seasonal rhythm two distinct types of crops can be grown : (1) sub-tropical crops, such as rice, in summer, and (2) temperate cereals, such as wheat, in winter. It is a type of climate which favours a very wide range of production. Complementary to this is the natural vegetation with its admixture of sub-tropical and temperate species ; camphor woods and palms on the one hand, chestnuts and maples on the other.

The favourable conditions of relief, soil and climate, and the magnificent system of natural waterways, and also its comparative remoteness from the menace of the steppeland hordes which so often handicapped the North, have made Central China the chief focus of population and the heart of Chinese civilization, although the origins of that civilization are to be sought in the basin of the Hwang ho and not in that of the Yangtze. The primacy of Central China has been most marked under the republic.

The major divisions of Central China, for the purposes of a more detailed description, are as follows :

- (E) The Sino-Tibetan Borderland
- (F) The Red Basin of Szechwan
  - (1) The Eastern Folded Region
  - (2) The Central Plateau
  - (3) The Min Basin and the Chêngtu Plain
- (G) The Central Yangtze Basin
  - (1) The Hupeh Basin
  - (2) The Lower Han Valley
  - (3) The Tungting Lake-basin
  - (4) The Poyang Lake-basin
- (H) The Lower Yangtze Valley and Delta
  - (1) The Lower Valley
  - (2) The Delta
- (I) The Hangchow Basin

### (E) THE SINO-TIBETAN BORDERLAND

The Sino-Tibetan Borderland, unique both in its physical features and in its human geography, is a frontier region incapable of precise delimitation embracing the marginal lands between historic China and the lofty Tibetan plateau. Though it is really the western fringe alike of North and South as well as of Central China, it is



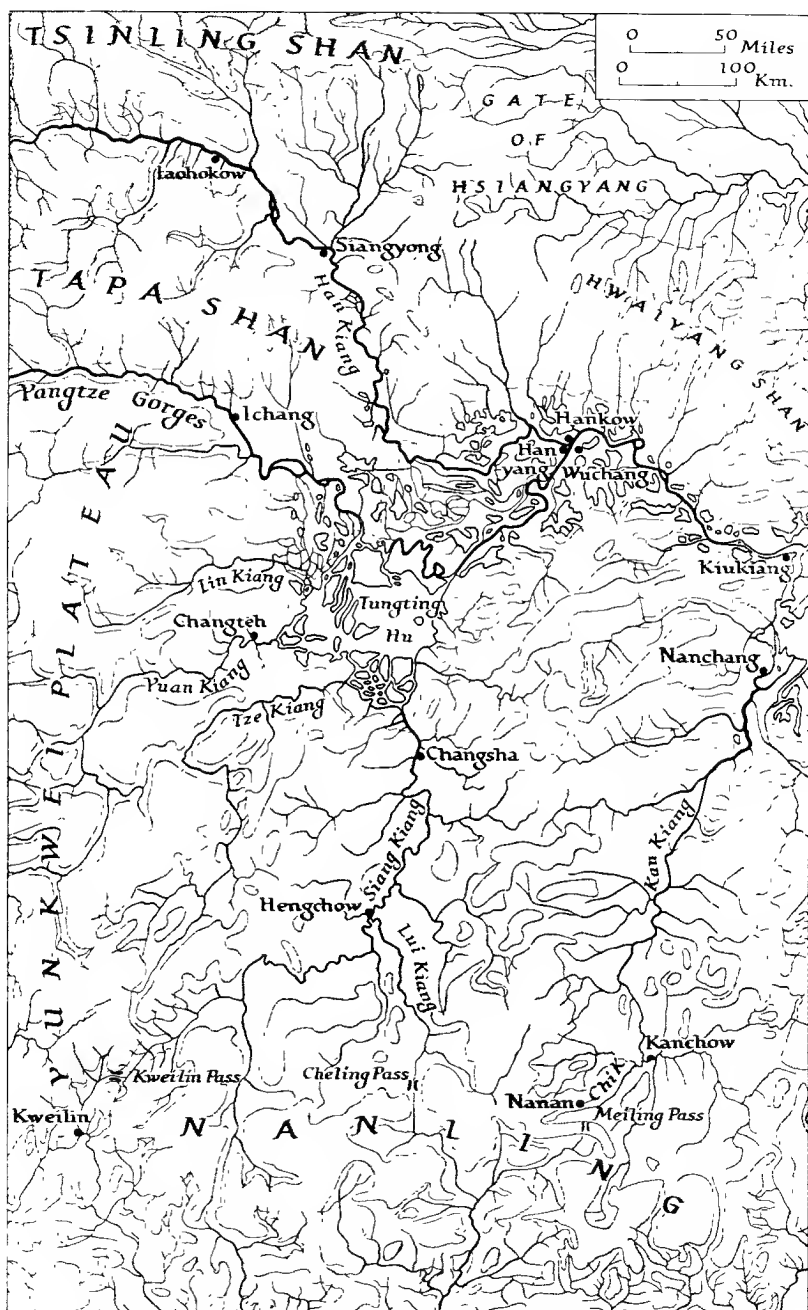


Fig. 27. The Central Yangtze Basin.

Based on *New Atlas of China*, plates 29, 31, 37 (Shanghai, 1934)

most convenient to include it in the regional study of the latter. From western Kansu, west of Lanchow, it runs in a south-westerly direction as a zone of varying width, including the Min shan, the western marches of Szechwan, with the Szechwanese Alps, and the north-western part of Yunnan (see p. 130). The region, however, includes considerable areas of the new provinces of Sikang and Tsinghai, outside the boundaries of China Proper.

Physically it is a wild mountain region, aptly described as 'a mass of sawtooth peaks, precipices, box canyons, sombre forests and pounding streams'.\* In contrast to High Tibet, with its rolling grasslands and shallow swampy valleys, the southern portion of the borderland, though some thousands of feet lower, has been deeply dissected by rejuvenated streams—the Salween, the Mekong, the upper Yangtze, and their tributaries (Figs. 14, 39)—into deep gorges with lofty ranges between (Plates 3, 83, 87). Farther north the region is lower in elevation, and, though still rugged and complex, does not display the great contrasts shown in the south; the drainage lines, too, tend to run west-east rather than north-south.

Little systematic exploration has as yet been carried out over this vast mountain country and the details of its geology and structure are largely unknown. The southern portion is dominated by north-south ranges of the Alps of Sino-Tibet, which originated in the mid-Tertiary Himalayan movements and whose direction was largely determined by the presence of the old stable block of the plateau of Tibet to the west (see p. 129). The most remarkable of these ranges is the Tahsueh shan (Great Snowy Mountains) on the western borders of Szechwan, where several peaks rise to over 20,000 ft., of which the highest is Minya Gongkar (or Konka) south of Tatsienlu, a granite batholith culminating in a pyramid resembling the Matterhorn, over 25,000 ft. high (Plate 33). Throughout the system metamorphic rocks predominate, such as schists, quartzites, and metamorphosed limestones of Palæozoic and Mesozoic age, often with intrusive granites and gabbros. Many glaciers occur in this mountain mass.

The northern portion of the borderland, though lower, has several lofty ranges running east-west with the same alignment as the Central Mountain Belt. The Min shan, in south-west Kansu, is a rugged limestone chain, Alpine in character and generally snow-clad, with peaks 20,000 ft. high. Owing to decreasing precipitation the

\* Edgar, J. H., 'The Haunts of the Giant Panda', *Journal of the West China Border Research Society*, vol. iii, p. 29 (Chêngtu, 1926-9).



snow-line in the north is higher (18,000 ft. in Kansu as compared with 13,500 ft. in Yunnan) and glaciers are few. Very little is known of the rock composition and character of this complex of ranges and valleys, but it is believed to consist largely of Archean and Palæozoic metamorphic and sedimentary rocks similar to those forming the Tsinling (Plate 35).

The borderland as a whole is thickly forested and protected by inaccessibility from the destructive clearing of Chinese farmers, who have wrought such havoc with the natural vegetation of the lowlands to the east (see p. 202). The moister upper slopes, below the snow-line, are covered with rich stands of conifers, which give place to deciduous trees, shrubs and evergreens on the lower slopes. There are large areas of grassland and mountain meadow in the high valleys of the south and over much of the north, where precipitation is inadequate for tree growth (Plate 119). Wide variations of the vegetation cover may occur in the same valley; the north-facing slopes are often thickly covered with coniferous or mixed forest, while the drier south-facing slopes have grasses with a few scattered shrubs and bushes (see p. 263). The fauna, too, has special characteristics and includes a number of rare animals, of which the most famous is the Giant Panda (*Ailuropus melanoleucus*), which is found in the Mupin and other districts of the Tahsueh shan.

In so rigorous a mountain environment the population is, of necessity, very scanty, and the Chinese are outnumbered by the tribespeople. The Chinese live either in market centres or in agricultural settlements. The market centres serve the few difficult routes which pierce the borderland and link China with Tibet. The best known and most famous historically of these routes is that from Yachow, on the western limits of the Red Basin, via Tatsienlu to Batang (Paan), on the upper Yangtze. An endless stream of human carriers from Chêngtu bring tea, cloth, tobacco and other products of lowland China to Tatsienlu, where they meet the yak caravans from Lhasa and return with wool, skins and hides from Tibet. The agricultural settlements are mainly on the alluvial fans of the wider valleys, which allow the irrigation and terracing so characteristic of Chinese farming: barley, oats, potatoes, beans and vegetables are the chief crops, but wheat and maize are grown below the 10,000 ft. line. At best the Chinese retain a precarious foothold in an inhospitable country, where travellers are frequently exposed to the attacks of bandits; the control exercised by the Chinese government over the borderland has never been very strong.



Plate 33. Minya Gongkar

Minya Gongkar, the loftiest mountain in China, is over 25,000 ft. high; several glaciers originate in this characteristically Alpine mountain mass.

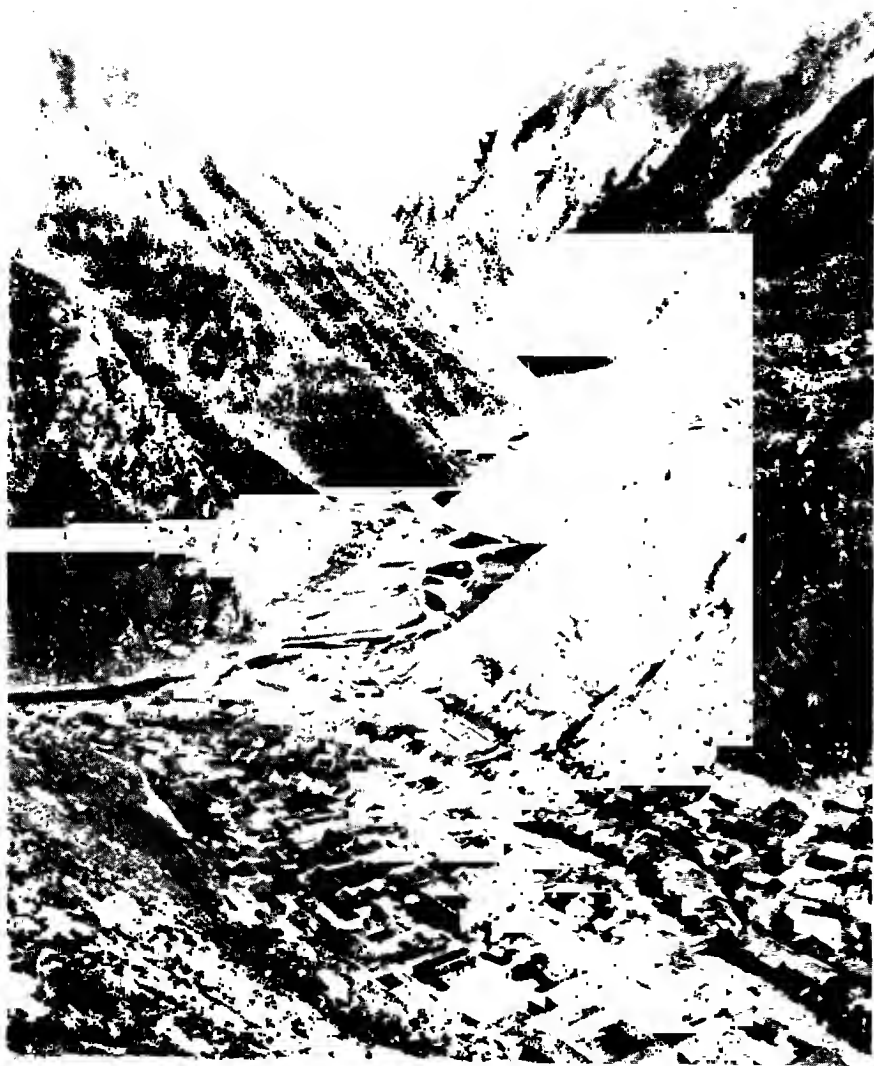


Plate 34. Tatsienlu

Tatsienlu, the gateway to Tibet, is the chief of the Chinese market centres of this region; the Roman Catholic church is conspicuous in the centre foreground.

The tribespeople are a bewildering mixture of racial stocks, often of obscure origins ; the Lolos, in particular, provide an ethnic puzzle (see p. 431). The Ngolock, Tebbu and other tribes of the north are mainly Tibetan in origin. Though the tribespeople as a whole have steadfastly resisted all attempts at Chinese penetration, certain tribes, notably the Hsifan, who are mainly primitive hillside farmers, have adopted many elements of Chinese culture because of its prestige. The majority of the tribes, especially those of the north, are pastoral nomads, some of which practise a form of transhumance. The borderland raises many ethnic and linguistic problems which still await a thorough investigation. It is certain, however, that the new importance of West China as a whole will not leave the region untouched, and during the present war there has been a considerable infiltration of Chinese peasant farmers into the eastern valleys of Sikang as a part of the great displacement of population caused by the Japanese invasion (Plate 36).

#### (F) THE RED BASIN OF SZECHWAN

##### *General Features*

No natural region in China, or perhaps in the world, has greater individuality or is more capable of precise definition than the Red Basin of Szechwan, now the heart and organizing focus of 'Free China'. Its fertility and resources are such that it has been called the 'Eden' of the Chinese Republic ; but its isolation has been so great that it remained largely a world apart, until the exigencies of the present war with Japan made it the centre of Chinese resistance and reconstruction. This isolation has been due to the very unusual difficulties of approach. The great oval-shaped basin, about five-sixths the size of Great Britain, is completely surrounded by high and broad mountain masses. On its western Tibetan border the magnificent Szechwanese Alps rise to 20,000 ft. On the south and south-east the high wall of the Yunkwei Plateau makes a less imposing but very significant barrier. On the north the Tapa shan plays the same role, and, although it is penetrated by the head streams of the Kialing, which rise in the Tsinling (see p. 78), it is an effective boundary also on the north-west. The one real routeway into the basin has been by the difficult Yangtze gorges from the Central Yangtze Basin (Fig. 26).

*Structure and Relief.*—The term basin as applied to Szechwan needs some definition. It is not a basin in the same sense as the

Central Yangtze Basin, which mainly consists of lake-studded alluvial plains; on the contrary it is extremely hilly and comprises only one considerable plain. Geologically it resembles that of Shensi (see p. 71) as a basin of accumulation in which sediments were laid down from Palæozoic to Tertiary times. But unlike the Shensi basin, whose elevation is almost as great as that of the neighbouring plateaux, Szechwan, hilly though it is, lies considerably lower than the high mountains which encircle it.

Throughout the greater part of Palæozoic times, it was part of the vast inland sea of South China, but it escaped the Mesozoic folding which raised and crumpled the strata over much of China south of the Tsinling shan. It became a vast lake in which red sandstones were laid down, under conditions rather similar to those of the deposition of the Trias in England; and the central part of the basin has great salt deposits, comparable to those of Cheshire. It remained a lake until far into Cretaceous times, when it was finally uplifted, and the margins of its basin were folded (see p. 474). The results of this folding are seen most clearly in the eastern part of the basin which has numerous parallel ranges and valleys with the characteristic north-east to south-west Cathaysian trend. During the later Himalayan movement the basin seems to have been warped so that the western part is now more depressed and the eastern more elevated and there is a distinct westward tilt. Equally pronounced is the general dip from north to south which determines the direction of the tributaries of the Yangtze.

*River System.*—Szechwan means 'Four Rivers', and derives its name from the four principal tributaries which drain practically the entire basin southwards to the Yangtze, which itself flows along its south-eastern margin from Pingshan to Kweichow where it enters the gorges. These tributaries from west to east are:

- (a) The Min kiang which rises in the Min shan, one of the western mountain ranges, and which, after irrigating the Chêngtu Plain (see p. 91), joins the Yangtze at Sui, the limit of important steamer navigation. The Min, rather than the Kinsha kiang (River of Golden Sand), is usually considered by the Chinese as the real head stream of the Yangtze.
- (b) The Lu ho or Chung kiang which flows into the Yangtze at Luchow.
- (c) The Suining ho.
- (d) The Kialing kiang.

The last two drain practically the whole of the central and eastern part of the basin and finally unite to join the Yangtze at Chungking, the greatest river port of the province, and at present the capital of the Republic of China.

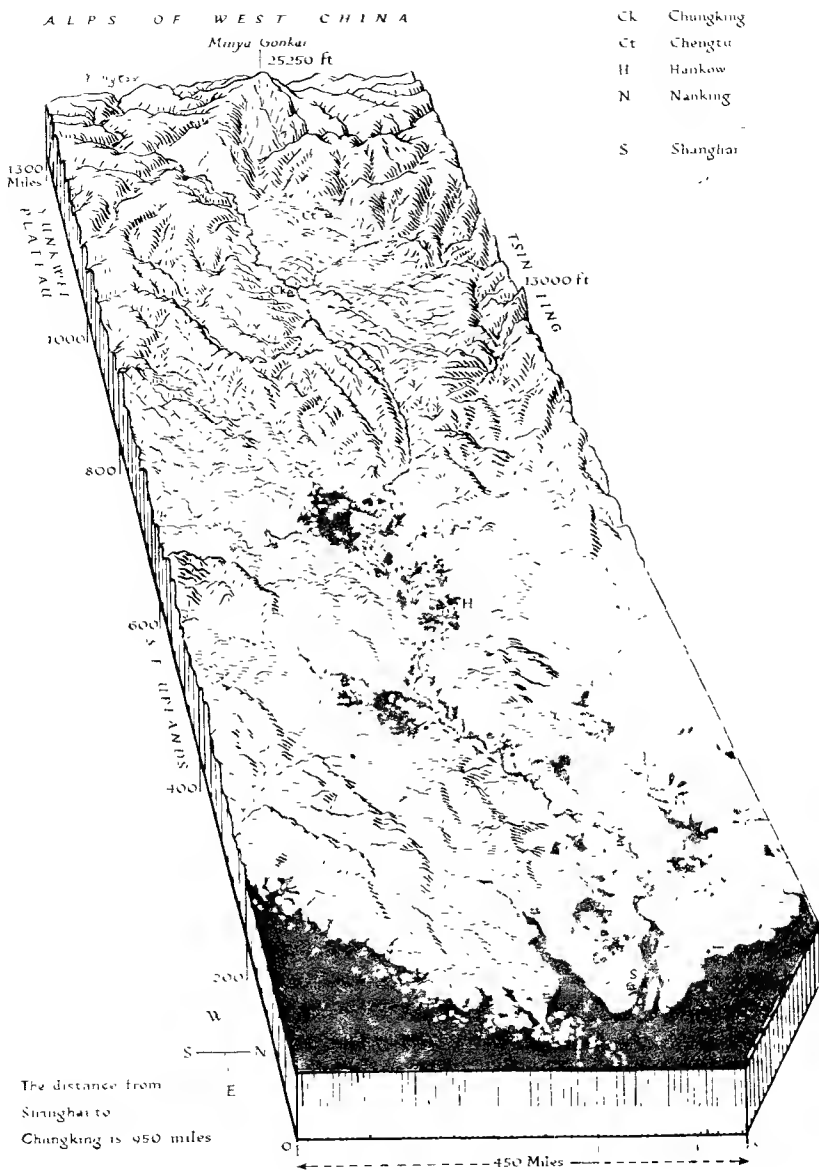


Fig. 28. The Yangtze Valley

Based on *New Atlas of China*, plates 27, 29, 31, 35, 37, 39 (Shanghai, 1934).

This block diagram shows the alignment of the valley and its relation to the surrounding uplands. The large extent of lake country in the Central Yangtze Basin is clearly evident. Distances given are approximate.

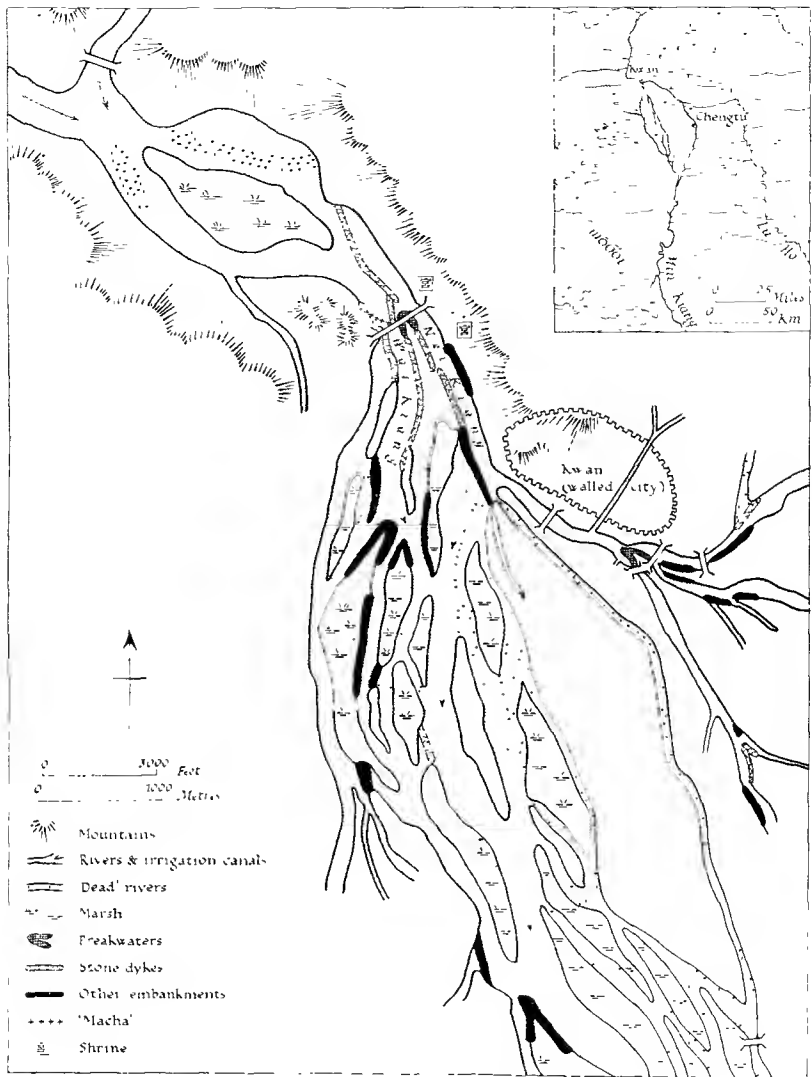


Fig. 29. Irrigation system in the Chéngtu Plain

Based on (i) 'Ancient Irrigation System', *China at War*, vol. vi, No. 1, p. 72 (Hongkong, 1941); and inset on (ii) *Niz Atlas of China*, plates 27 and 34 (Shanghai, 1934)

The waters trapped near Kwan are led through thousands of channels fed from the Min kuang and Lu ho and irrigate this area of remarkable fertility. The 'macha' are dams made of baskets of stones, held together by wooden tripods about 30 ft high, and protected by reeds and clay. They are constructed in order to permit dredging in the early spring

These rivers and their numerous tributaries have dissected the landscape into a most intricate and frequently very beautiful pattern of ridges and valleys, so that it has a very diversified and hilly, but not mountainous, character. The ridges are mainly between 1,500 and 2,500 ft. in height, reaching 5,000 ft. towards the margins of the basin, and are on an average about 700 ft. above the valley levels. The height of the valley trough, in which the Yangtze flows at the south-eastern margin of the basin, is about 1,300 ft. at its western end, and about 600 ft. at its eastern end where it enters the gorges.

*Agricultural and Mineral Resources.*—Many factors combine to give the Red Basin its well-known reputation in China as an 'Earthly Paradise'. The high mountain ramparts which surround it afford protection from the bitter north-western winds characteristic of North China in winter. The frequent mists and the notorious lack of winter sunshine are rather unpleasant features, and the humid heat of summer is sometimes oppressive, but the climate, as a whole, is equable and extremely favourable to production, frosts are rare, except on the high lands, and almost unknown in the south, the rainfall is well distributed and reliable, and droughts seldom occur; the risk of flooding is much less than on the Yangtze lowlands below the gorges, or in the North China Plain. Over a great part of the basin, the growing season lasts almost through the year. The soils, not only in the exceptionally favoured Chêngtu Plain, but also on most of the hills, are not nearly as acid as on most of the uplands of China south of the Tsinling. The parent rocks are soft and easily eroded, but the hill slopes lend themselves to terracing, which prevents excessive run-off and erosion, and which conserves the natural fertility of the soils. Nowhere in China has the art of terracing been carried to such perfection, the hills being frequently terraced up to their summits (Plate 42).

The local detail of land utilization depends upon the presence or absence of irrigation, and also upon the exposure of particular rocks, and on the soils derived from them. These are not necessarily the same as the parent rocks, for many of the Szechwanese sandstones weather into purple clays. Indeed, it is often contended that the term Red Basin—originally given by Richthofen—is rather a misnomer and that a better title would be the 'Purple Basin'. In general the clays are used for terraces. Their water-holding qualities make them easy to irrigate, and they are naturally suitable for rice cultivation. Clays are also frequently cultivated, along with other soils, on the long, sloping, unirrigated fields of the ridges.



Sandy and other dry soils are forested with bamboos, pines, cypresses and oaks, with some sub-tropical trees such as palms. All have their value and the bamboo is extensively used in the machinery of the brine industry.

Some slopes have been altogether denuded of their soils, but the erosion problem is acute only in restricted areas. Terraces are often found on slopes of as much as  $30^{\circ}$  and sometimes as much as  $60^{\circ}$ . They rise to the top of the valley sides whenever water can be brought along irrigation canals from above or raised by various devices from below. These include all kinds of water wheels, some driven by animals and some turned by human labour. The terraces of Szechwan are a memorial to many centuries of hard and patient toil.

Rice is the crop of the flooded lands. It is sown in seed beds during April or May, and is transplanted to the fields after the rains have made summer flooding possible. As the rains die away the grain ripens quickly in the drying fields, and the harvest occurs in September, after which the rice fields are prepared for the winter crop. Wheat is very commonly grown after rice, sometimes interplanted with beans; even the terrace banks are planted with winter crops such as beans or with mulberry trees. Summer dry crops on the ridges include maize, sugar cane, tobacco, many types of beans, sweet potatoes, millets and a great variety of vegetables. The war has given a great stimulus to the cultivation of cotton. In some localities there are orange groves, and tea is grown as an upland crop. Mulberries are found throughout Szechwan, and silk and tea have long been exported to other parts of China.

With all these natural advantages which the industry of the Chinese farmers has turned to the fullest use, and with such a quantity and variety of crops, the Red Basin deserves its reputation as an 'agricultural Eden', and the villages, set amidst its pleasant landscapes, are on the whole prosperous and attractive, although even here the pressure of population is so great that the standard of living is low. For centuries the province has been virtually self-sufficing, and this, in conjunction with its great isolation, has fostered an intense regionalism which, in times of political anarchy or disturbance, has often taken the form of almost complete independence. 'Szechwan for the Szechwanese' has been a well-known slogan. This isolation, however, already diminished by the development of steamboat traffic through the gorges and later by new roads and air transport, has now been largely broken down by the dramatic events of the war. Hitherto, the prosperity of Szechwan

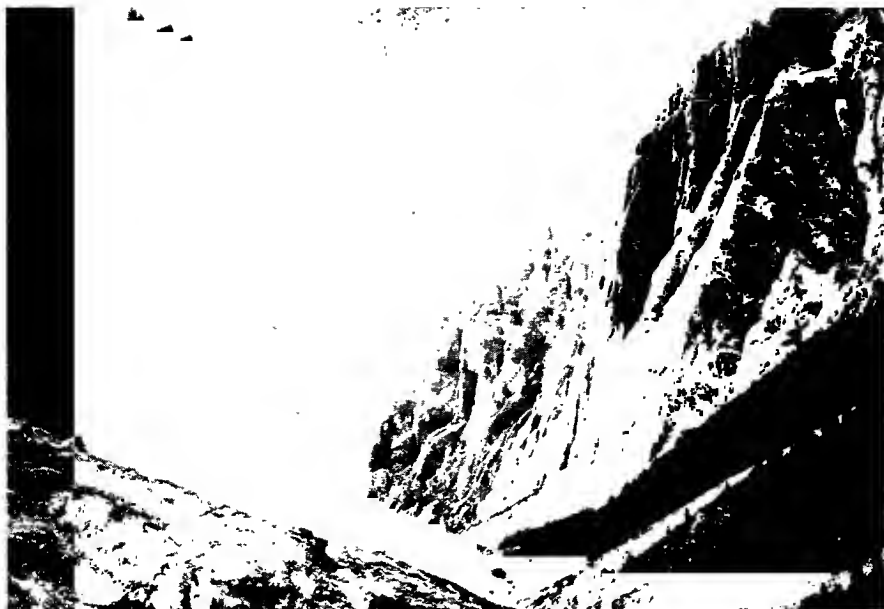


Plate 35. The Min shan, Kansu

This striking gorge, at 11,000 ft., has bare limestone cliffs and scanty vegetation.



Plate 36. Tribal village in the Sino-Tibetan Borderland

The villages of the tribespeople are usually found in the upper parts of the valleys. In the foreground are barley fields and racks for drying the crop.



Plate 37. Chinese settlement in the Sino-Tibetan Borderland  
This highly-cultivated and terraced alluvial fan is characteristic  
of the Chinese agricultural settlements of the region.



Plate 38. Yenchingkow, Szechwan  
This narrow valley in the Eastern Folded Region of the Red Basin shows  
ricefields on the valley floor and on the terraced gentler slopes.

had depended almost entirely upon agricultural wealth, and the province had escaped the industrialization which had set its mark upon the lower Yangtze and even upon the Central Basin. Now, however, the stage is set for the utilization of the very considerable mineral resources of Szechwan as a basis for industrial development ; the war years have already seen a remarkable transformation.

This mineral wealth is very varied and is a reflection of the long history of deposition in the basin, the nearest regional analogy in China being that of the Shensi basin (see p. 72). The most important of these resources are coal, salt and petroleum. Their distribution and significance are best considered in relation to the major regional subdivisions of the basin. These are, from east to west : (1) the Eastern Folded Region, (2) the Central Plateau, and (3) the Min Basin, which includes the far-famed Chêngtu Plain.

#### (1) *The Eastern Folded Region*

This region lies to the east of the Kialing, and is characterized by the close succession of parallel ranges and valleys aligned from north-east to south-west (see p. 86). The arches of the up-folds have been eroded so that Triassic limestones form the crests while the valleys in the down-folds between them are floored by red sandstone. The long parallel limestone chains, rising from 2,000 to 3,000 ft., run for great distances in almost straight lines with even crests, hardly interrupted by a single prominent peak. Their upper flanks are steep and form dividing walls between the fertile terraced slopes of the highly cultivated red sandstone valleys (Plate 38).

In addition to its agricultural wealth the Eastern Folded Region has considerable mineral resources which include coal, iron-ore, slate and limestones ; its natural outlet is at Chungking with which it is linked by fairly good water communications. Although coal-measures outcrop all round the northern and north-western margins of the basin, their most important occurrence is in the Eastern Folded Region, and in the part adjacent to Chungking certain fields are now being actively exploited to supply the new industrial development. These are the Kialing field and the Nanchwan field, the latter lying to the east of Chungking, and south of the Yangtze on the rim of the Red Basin. Most of the coal yielded is of high phosphoric content and needs special treatment, but a limited amount of the Nanchwan coal is suitable for metallurgical purposes and this field is not far from the Chikiang iron-ore deposits which have a high iron metallic content. The triangular area lying between

the war-time capital and the districts of Nanchwan and Chikiang is one of the most important of the new industrial regions developed in Free China. To it many factories from the Japanese-occupied coastal districts have been transferred, and a number of small-scale industries, including weaving, dyeing and food processing have also been established. Chungking seems destined to become a great industrial centre.

Other coalfields are certain to be developed in Szechwan in the near future. The coal resources of the province are estimated at nearly ten billion metric tons, a little more than 4% of China's total. Actually, Szechwan ranks third among the Chinese provinces, coming next to Shensi, but a very long way behind it. Its coal-measures, too, are mainly of Jurassic age and inferior in quality to the great Permo-Carboniferous fields of north-west China.

## (2) *The Central Plateau*

This is the largest of the major sub-regions, covering all the centre and extending to the farthest limits of the Red Basin on the north and south. The predominant rock is red shale which erodes more or less vertically, and which lends itself readily to terracing. In contrast to the folded region on the east, it has no coal and no limestone for building, but it is this region which contains the large salt deposits and also holds the greatest prospects for petroleum.

The principal district of salt production lies between the lower valleys of the Min and Lu, and here the extraction of salt from brine wells and springs is a very ancient industry. Some of the well borings are as much as 3,000 ft. in depth, and the traditional method of pumping the brine is by the labour of the patient and stolid water buffalo. By such primitive methods Szechwan was able to supply its own needs and, to a large extent, those of neighbouring provinces. The situation, however, has now been changed by China's loss of the sea salt of the coastal fringe from Shantung to Kiangsu, as a result of the Japanese occupation. This has led to a greatly increased national demand for rock salt. One of the consequent developments of the war years has been the rapid growth of a large industrial centre, equipped with modern well-drilling machinery, at Tzeliu-tsing, the chief town of the Szechwan brine district (Plate 41).

Natural gas is often found in strata underlying the salt beds, and has been used to evaporate the brine. Oil is known to occur in six different horizons, three of which are in the coal-bearing series. The extent to which the oil has been preserved in large quantities is

still somewhat uncertain, but wartime experiments tend to show that Szechwan will be a valuable, if limited, source of petroleum—certainly the most important in all China, which in this respect is not well endowed.

### (3) *The Min Basin and Chêngtu Plain*

The Chêngtu Plain, although only half the size of Yorkshire, is renowned throughout China, and indeed the whole world, for its exuberant fertility and productiveness and for the almost incredible number of farms which it supports. This has been made possible by a marvellous feat of water engineering carried out more than 2,000 years ago (Fig. 29 and Plate 40).

The so-called Chêngtu Plain is really a gently sloping alluvial fan, over which the waters of the Min river, pouring out of a gorge in the Chingcheng shan (Azure Wall range) at the little town of Kwan, are guided into thousands of intricate irrigation channels.\* Chêngtu, the historic capital of Szechwan, which gives its name to the Plain, is situated at the eastern edge of the irrigated area.

The origin of this scheme goes back to the time of the Ch'in dynasty (255–206 B.C.), when great public works were being initiated and it is attributed to Li Ping, an official under the dynasty, and his son. Temples in honour of their stupendous achievement stand near the spot where the first diversion of the water occurs. Long after this there were extensions and developments of the original scheme under the Mongol or Yuan (1279–1368) and the Ming (1368–1644) dynasties, and a still greater expansion is now contemplated, but in essentials the system has remained unchanged.

The Plain is one of the richest and most beautiful gardens in the world. It is covered by prosperous villages, hamlets and isolated farms which are surrounded by groves of cedars, cypress and mimosa, with a background of distant pine-covered hills, crowned with pagodas. The rivers have many flour, oil and paper mills and are crossed by bridges of stone or lacquered wood.

Lower down the valley of the Min and with its centre at Kiating (Loshan), another new industrial district is rapidly developing. Some coal of inferior quality is yielded by local fields, but here the chief source of power is likely to be hydro-electric. The district lies

\* A classical account of this irrigation system is given in Sir A. Little, *The Far East*, pp. 78–90 (Oxford 1905). Since his book was written certain modern features have been introduced and the subject will be discussed in the section devoted to irrigation in Vol. II of this Handbook.

on the western margin of the Red Basin close to the mountain ranges of the Tibetan border with great potentialities for the development of such power. A significant development has been the recent erection by the Government of a steam-turbine electrical power plant known as the Minkiang Electrical Power House. The district is well placed for the supply of raw materials for its rapidly developing sugar, paper and other industries, but is handicapped by the local deficiency of iron ore.

Some of the factories now established in Szechwan may be taken back to the coast after the war, but the province will undoubtedly play an important part in China's industrial future.

### (G) THE CENTRAL YANGTZE BASIN

#### *General Features*

This great region is the heart of China Proper, and is the natural focus of many of the major routes of the country. Its pivot is the Wu-Han group of cities (Hankow-Hanyang-Wuchang), which stand at the head of navigation for ocean liners on the Yangtze where it is crossed by the trunk railway from Peiping to Canton. Thus they lie at the intersection of the major north-south and east-west lines of communication in China (Plates 46, 101).

The Central Basin, in its widest interpretation, is a part of the great longitudinal depression between the eastern uplands and the western highlands of China (see p. 18). It is homologous with the North China Plain, from which it is separated by the Hwaiyang mountains, but it is much more complex.

The outer limits of the basin are the steep truncated eastern ends of the Tapa shan and the Gorge mountains on the west,\* the Funiu shan and the Hwaiyang shan on the north, the Wuyi shan, the high fault scarp of the South-Eastern Uplands, on the south-east, the Nanling Belt on the south, and the scarp edges of the Yunkwei Plateau, with its striking break of slope (Fig. 5), on the south-west (Plates 43, 44).

The Central Yangtze Basin is essentially one of accumulation. Deposition from the surrounding uplands and highlands still continues, and it is probable that the lakes are slowly being filled by silting. Most of them are very shallow, and, in winter, they are

\* The Gorge mountains region, through which the Yangtze cleaves its difficult way between the Red Basin of Szechwan and the Central Yangtze Basin, may be regarded as a zone of contact between the southern limb of the Central Mountain Belt and the north-eastern extremity of the Yunkwei Plateau (see p. 132).



Plate 39. Yuehsi, in the western borders of Szechwan

The village has fortified towers as a protection against bandits ; fields and an irrigation ditch are seen in the foreground.



Plate 40. The Min kiang near Kwan, Szechwan

The Min kiang is divided near Kwan and its waters led into the irrigation channels of the Chéngtu Plain.





Plate 41. Brine wells, Tzeliutsing, Szechwan

The salt industry consists mainly of small individual enterprises ; the rough derricks are constructed of wooden poles.



Plate 42. Terrace cultivation in the Red Basin

The gently rolling hill slopes are terraced, but the steeper slopes are left forested.

largely replaced by marshes with wandering streams in shallow channels. It should be noted that most of the maps show the summer conditions when the lakes attain their greatest size (Figs. 27, 36).

The course of the Yangtze is obviously related to the alignment of the surrounding mountains. Two dominant directions are clearly seen: (1) long stretches from south-west to north-east, where it flows in a wide open valley, parallel to ranges with this Cathaysian trend; and (2) shorter stretches from north-west to south-east, where it cuts down through low ridges and where its valley is markedly restricted. The Yangtze, however, is still very much a river in the making and does not possess the easy flow characteristic of a mature drainage system. Flowing, as it does, through lake-strewn lowlands and unable to cope with exceptional summer flood waters (Fig. 31), except by pouring them over the countryside, the Yangtze is comparable in its youth with the Mississippi. Less modern engineering work has been carried out on the Yangtze than on the Mississippi; but after the 1934 floods, thirty dykes along the main river, and over eighty along the Han, covering a total of more than seventy-five miles, were repaired and strengthened. There are also schemes for deepening the river, especially where shoals exist. These should improve the discharge of flood water, but American experience in grappling with the problem of the Mississippi does not suggest that the complete subjugation of the river will be easily achieved (Plate 45).

The major subdivisions of the Central Yangtze Basin are as follows: (1) the Hupeh Basin, (2) the Lower Han Valley, (3) the Tungting Lake-basin, (4) the Poyang Lake-basin.

#### (1) *The Hupeh Basin*

At Ichang, where the Yangtze escapes from the gorges, the river is only 300 ft. above the level of the sea, still some 1,000 miles away. Below Ichang, for about sixty miles, it cuts through a foothill belt of sandstones and gravel which forms the western border of the Hupeh depression. In this foothill section of its course, a flood plain is developing with incipient meanders, and the river is cutting into bedrock on the outside of each bend. Loam-capped terraces mark the levels of earlier erosion cycles, and the lowest of these is considerably above the present river bed; their origin is still a matter of controversy. They are not seen in the Hupeh basin itself, but become recognizable once more around Hankow and along the lower reaches of the river.

After the passage through the foothill zone, the Yangtze enters the Hupeh basin proper, the largest continuous area of plain in Central China. The meanders of the river now become very pronounced, but it is gradually straightening its course by cutting through the narrow necks of land between the reaches. It is probable that the Tungting lake formerly extended to the Yangtze, and that the steady

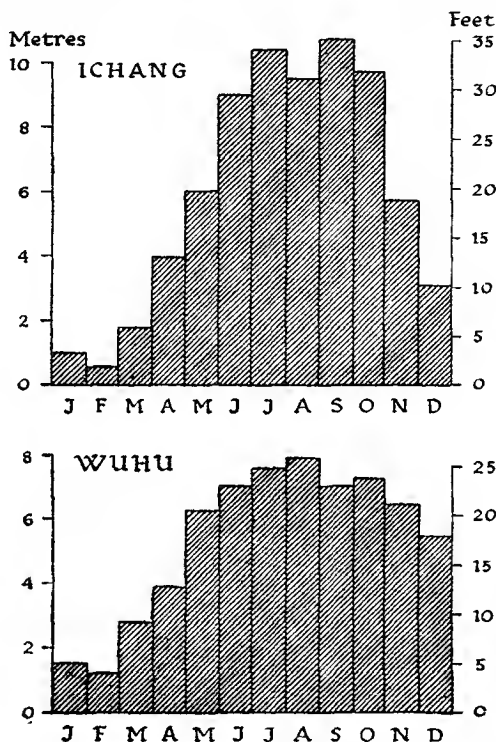


Fig. 30. Seasonal changes in the level of the Yangtze at Ichang and Wuhu  
Based on Sion, J., *Géographie Universelle*, tome ix (*Asie des Moussons*), première partie, p. 127 (Paris, 1928).

The seasonal changes are much greater in the upper parts of the river basin.

deposition of silt, brought down by the heavily charged river, has gradually created the present barrier between them. The Yangtze itself has been deepened by dredging, but floods are liable to occur, and embankments have been built to protect the settled and cultivated areas. The difference between average high and low water is about 33 ft. at Ichang (Fig. 30), but in exceptional years it may be considerably greater.

The Hupeh plain has a large number of lakes linked by river channels, and there is an extensive series of canals between the Yangtze and the lower Han. The lakes have not been scientifically studied, but they seem to be similar in formation and function to Tungting and Poyang lakes. In winter they are almost dry, but in summer they often fuse into one vast flooded area, broken towards Hankow by intermittent uplands.

The Wuhan cities stand near low ridges through which the Yangtze has cut, and the lowland is here more restricted. In the plains around Hankow, flooding is liable to be most serious (Fig. 31). The embankments are frequently broken during the rapid rise of level in summer, and the surrounding countryside is submerged. In places, as a result of the steady silting up of its bed, the river is flowing above the level of the plains around. Some areas are flooded annually, but cultivation takes place as the waters subside, when beans, wheat and cotton are planted. Elsewhere floods are likely to occur only once in every five or six years, and here the farmers push the cultivated area close to the river banks and even cultivate islands in the river itself (Plate 45).

## (2) *The Lower Han Valley*

The Han, the longest of all the great tributaries of the Yangtze, flows into it at Hankow. Its upper valley, and particularly the important Hanchung basin, have already been discussed in connection with the Central Mountain Belt within which they lie (see p. 78). The deep but not continuous gorges, through which the Han cuts below Hingan, mark the real boundary between the Central Mountain Belt and the Central Yangtze Basin.

The Han emerges from these gorges at Laohokow, and lower down at Siangyang it receives a number of tributaries which drain the southern slopes of the Funiu shan and of the uplands of the Hsiangyang gap, by which easy and important routes reach it from the North China Plain. The valley of the lower Han below the gorges is of an entirely different character from the upper portion, and may be regarded as a northern extension of the Hupeh basin. The banks of the river are generally low and flat, and the river itself is constantly changing its bed. A rise in level of 3 or 4 ft. may increase its width by more than half a mile. In general, however, the rich lowlands around it are well protected, for there are dykes on either side of the river, and supplementary dykes are built whenever a flood seems imminent.

The Han shows seasonal variations in level, but they are much less striking than those of the Yangtze, and the difference between the summer and winter levels is usually not more than 3 ft. In some years the summer level is remarkably low and, as in the case of the other Yangtze tributaries, there is little coincidence between its fluctuations and those of the master river. The Han becomes narrower towards its junction with the Yangtze where it is little more than 330 ft. in width. This curious phenomenon is due to

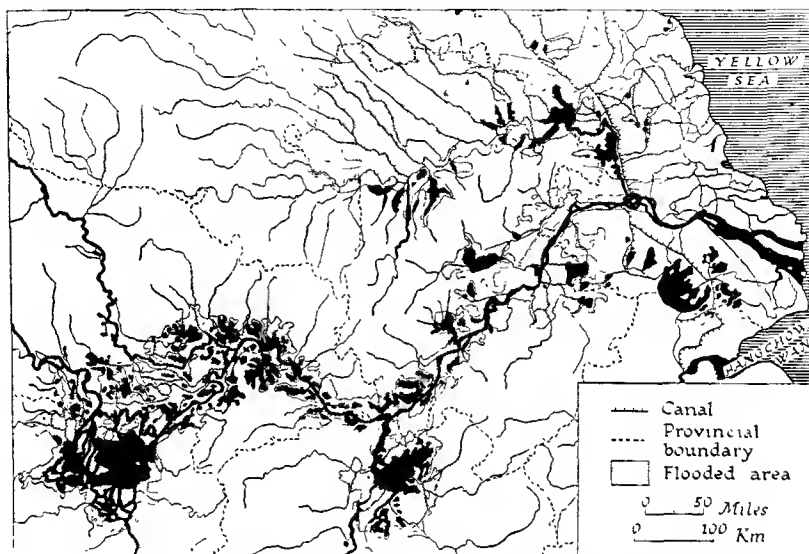


Fig. 31. Flooded areas in the Yangtze and Hwai valleys, 1931

Based on a map compiled by the National Flood Relief Commission, American Red Cross, in Cressey, G. B., *China's Geographic Foundations*, p. 288 (New York, 1934).

The flooded area covered 34,000 sq. miles and another 8,000 sq. miles was also affected. Apart from city populations, over 25,000,000 people lost most of their possessions.

the loss of water through various channels and creeks into the lake region of Hupeh. The Yangtze usually has very little effect upon the Han, but in some years may send its waters like a tidal current as much as fifty miles up the Han channel.

The lower Han valley and the Hupeh basin generally are intensively cultivated and show the characteristic Yangtze alternation of summer rice and winter wheat crops. Apart from the danger of flooding, the chief disadvantage of this region, so centrally placed and with such great agricultural resources, is its oppressive summer



Plate 43. The Yangtze gorges  
One of the river steamers running from Ichang to  
Chungking is making its way upstream.



Plate 44. A reach in the Yangtze gorges



Plate 45. Floods at Hankow, September, 1926

The Yangtze broke its banks and flooded the Chinese quarter of the city.

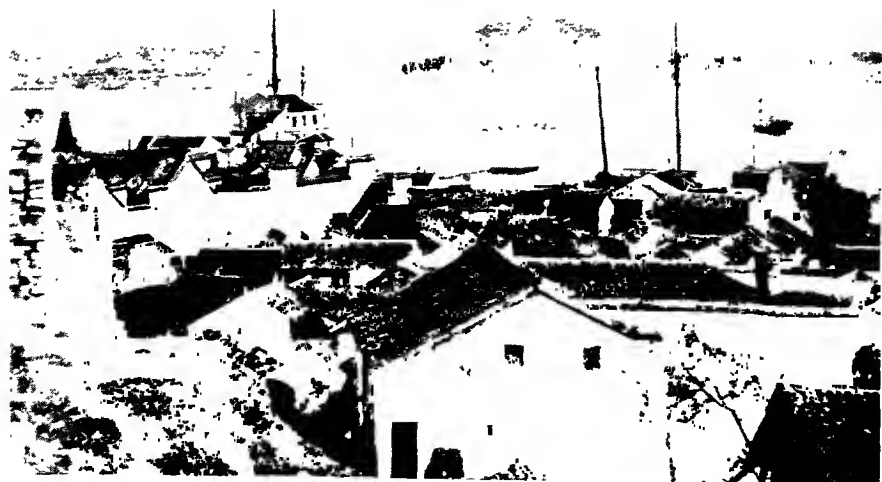


Plate 46. Wuchang, Hupeh

This photograph, taken from Hanyang, shows Wuchang (across the Yangtze) as a walled city built around a low ridge

climate. Hankow is several degrees hotter in summer than either Chungking or Hong Kong, and the humidity of the basin is increased by the large number of lakes and great expanses of water within it.

### (3) *The Tungting Lake-basin*

The depression in which the Tungting, the largest lake in China, lies is closely linked with the Hupeh basin, but it is being steadily silted up by the deposits brought by the Siang, the Tzu and the Yuan which flow into it from the south and south-west. The Yangtze also contributes silt, for in some summers the river level is higher than that of the lake and Yangtze water then pours into the Tungting hu. The lake itself has an average summer extent of about fifty by seventy-five miles, but it varies greatly from season to season. In winter it is replaced by a marsh which is the home of millions of wild fowl, snipe, swans, geese and ducks. Of the winter channels through the marsh, the most important is the Chenglin, which carries the waters of the Siang.

The lowlands around the Tungting form the richest 'rice bowl' in the country, and the Chinese determination to protect them and bar the approach to the vital corridor to Changsha has led to some of the bitterest fighting in the present war with Japan. These lowlands are strongly embanked but are liable to occasional floods, the result both of the heavy discharge of the rivers flowing into the Tungting, which may rise in summer to more than 30 ft. above the winter level, and to the overflow from the Yangtze into the lake (Fig. 31). The defences of the cities against floods are exemplified by Changteh on the Yuan kiang, a walled city between two hills about fifty miles from the lake. The walls are over 30 ft. high and 17 ft. broad and serve as a protection partly against attack and partly against inundation when the Yuan is in flood. Some of the six gates are closed and barricaded almost every year in the spring or summer. The walls have apparently been maintained since the time of the Han dynasty, two thousand years ago.

The Tungting lowlands are continued southwards by the lower valley of the Siang, the most important of the rivers flowing into the lake. It is one of the two vital corridors to the south and has given the province of Hunan immense strategic importance in the history of China. The Siang and its principal tributary the Lei, both rise in the Nanling and flow through sharply defined and narrow valleys to their junction at Hengchow. That of the Siang leads to the Kweilin pass through which a canal, said to have been made in



A.D. 214, gives water connection via the Kwei kiang with Wuchow and the Canton delta. The canal itself is now very little used for through traffic but the route is still important. The Lei valley leads up to the historic Cheling pass, the route followed by the Hankow-Canton railway.

The southern part of Hunan province, drained by these rivers and their affluents, is very hilly or mountainous country, much of it from 3,000 to 4,000 ft. in height, and forming part of the broad Nanling Belt. Extensive lowlands begin below Hengchow and from Changsha, the capital of Hunan, the Siang valley widens out into the 'rice bowl' of the Tungting flats.

The Siang basin contains the most important coalfields of Central China. In the main valley they are concealed by several thousand feet of Triassic and Tertiary sandstones, but these decrease in thickness upstream; the coalfields of the upper Siang, and still more of the Lei valley (known as the Leiyang field), are likely to be particularly significant now that this region is in rail connection with Kwangtung and Canton, which are very deficient in coal. The most important field hitherto has been the well-known Pinghsiang field on the eastern margin of the Siang basin on the mountainous Hunan-Kiangsi border. This has fairly thick seams of soft coal which produces good coke suitable for blast furnaces, and it was formerly the chief source of supply for the great Hanyehping iron and steel works at Hanyang (recently re-started in Szechwan). It was the earliest and much the largest enterprise of its kind in China, and Pinghsiang was put into direct connection with Hanyang by a branch line from the trunk railway, which for many years did not extend beyond Changsha. Now that the railway has been completed, Pinghsiang coal will be available for Canton. The branch line from Changsha now forms part of the new and fundamentally important east-west railway, from Hangchow through Nanchang to Changsha, which will ultimately be extended into Kweichow and Szechwan.

The other two large rivers which flow into the Tungting hu, the Tzu and the Yuan, drain the mountainous country of western Hunan. Their valley lowlands are restricted and their courses obstructed by rapids, but the Yuan is perhaps the most important lumbering river in China, and timber rafts, sometimes of enormous size, are floated down it to the Tungting hu and the Yangtze. The highlands of western Hunan are one of the few important timber regions still left in China, and are particularly rich in camphor woods.

#### (4) *The Poyang Lake-basin*

In many respects this is a striking replica of the Tungting Basin. The Poyang hu lies in a similar depression to the south of the Yangtze, but is more clearly detached from it than is the Tungting. It is of comparable size but longer and narrower (ninety by twenty miles at its greatest average extent in summer), and is likewise subject to great seasonal variation. In winter, the lake becomes an immense snipe marsh intersected by shallow channels which have a common outlet at Hukow. Low hills, with villages on them, rise above the marsh, and in summer these form islands in the lake. The alternations of level seem to depend on the amount of water in the Yangtze and in the rivers which directly feed the lake; of these, the Kan is much the greatest. The Yangtze and the Kan depend on widely separated regions for their water supply, and the Kan is sometimes quite low when the Yangtze is in high flood. When the times of high water in the two rivers synchronize the Poyang fills to capacity, and sometimes overflows on to the agricultural lands beyond its wide marginal belt of reeds. Occasionally this also happens when a high Yangtze dams back the waters of the Kan. In general the Poyang acts as a useful reservoir, and floods around it are less frequent than in the Yangtze valley around Kiukiang (Fig. 31 and Plate 50).

There is clear evidence that the Poyang hu is silting up. Even in summer there is a wide marginal belt of marsh around the lake, and the Kan winds for a long distance through reeds before entering it. Old lake deposits now form carefully cultivated lowlands, and a belt of infertile sands north of Nanchang is also probably lacustrine in origin. Nanchang itself, the capital of Kiangsi, now more than fifteen miles from its southern high water border, was at one time on its shores (Plate 49).

The wide lowlands south and south-west of the lake, and extending up the lower valley of the Kan, are intensively cultivated for rice; cotton and mulberries, and many varieties of tea are grown on innumerable peasant farms on the surrounding hills, which in this part of China are rarely terraced.

The province of Kiangsi (smaller than Hunan but nearly as large as Great Britain) almost exactly coincides with the drainage basin of the Kan. It is very hilly but, except in the south which belongs to the Nanling Belt, the hills mostly occur in isolated masses, and the lowlands are more extensive than in Hunan. Four streams unite at Kanchow to form the Kan which can be used by junks below that

town, and which is navigable for steamers below Kian, 160 miles above Nanchang. The valley of the Chi kiang, tributary of the Kan, leads up to the Meiling pass through the Nanling. This route from the Yangtze valley to Canton and South China is almost as important as that up the Siang via the Cheling pass. The Meiling route is the historic 'ambassadors' route' by which Lord Macartney's embassy from Great Britain was conducted from Canton to the imperial court at Peking in 1793. The routes through both passes converge on to the valley of the Pei kiang which leads down to the Canton delta.

The roles and characteristics of these two provinces of Hunan and Kiangsi are very similar. Both are very vital to the integration of Central and South China, and in both provinces southern forms of 'Mandarin' are spoken nearly up to the Nanling water-parting, an evidence of their historic connection with the north. The numerous mountain ranges between the two lake-basins do not form a complete natural barrier between them. Tongues of densely peopled lowlands, intermittent or continuous, penetrate into the hills from both sides and allow of fairly easy communication between Kiangsi and Hunan. The principal route is that followed by the new railway from Hangchow via Nanchang and Pinghsiang to Changsha; its great importance in linking the Yangtze delta with south-central China has been already emphasized (see p. 98).

The most striking mountain mass in Kiangsi is that of the Lu shan which rises sheer from the alluvial lowlands to the west of the Poyang hu to a height of 5,000 ft. and which trends from north-east to south-west for a distance of about twelve miles. It is of great geological interest and combines the characteristic Cathaysian trend with west-east thrusts analogous to those of the Tsinling and Nanling. The central position and accessibility of the Lu shan have led to the development, amid beautiful surroundings, of the famous mountain resort of Kuling; this is an invaluable health resort for the Yangtze valley during the most oppressive period of the summer (Plate 51).

## (H) THE LOWER YANGTZE VALLEY AND DELTA

### (1) *The Lower Valley*

The channel from the Poyang lake joins the Yangtze a little below the port of Kiukiang, and this point may be taken as marking the transition from the Central Basin to the lower valley of the Yangtze. From here to Nanking, a distance of over 250 miles, the great river



Plate 47. The Han at Hankow

The river is crowded with native craft ; Hanyang hill is seen in the background



Plate 48. The Yangtze near Hankow

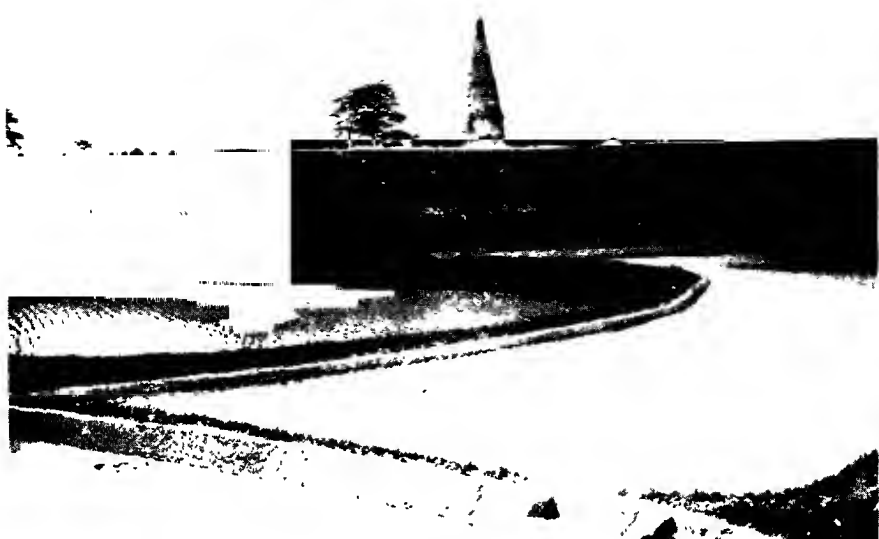


Plate 49. Landscape near Yuanchow, Kiangsi

This scene in the valley of the Sin kiang (a tributary of the Kan) shows flooded rice-fields. The building in the background is known as the Writing Brush Tower.



Plate 50. The Yangtze from the Lu shan

Typical summer flooding of the Yangtze plain near Kiukiang.

follows a north-easterly course parallel to the Hwang shan on the south and to the lower hill ranges of Anwhei on the north; these latter are continuations of the Hwaiyang shan. The Cathaysian trend is here dominant as it is in south-east China, and the main features seem to have been determined by the Mesozoic movements (see p. 474). It is probable that this is one of the oldest portions of the Yangtze, which in its present form is a highly composite river and has had a very complex physical history (see p. 36). From the ancient district of Yang around its lower valley it derives its name, which was for long restricted by the Chinese to this portion of its course.

The river is very broad and its valley is wide and intensively cultivated, although subject to floods, but the hills on either side are in sight until well below Nanking. The question of where the delta region begins is controversial. It is sometimes placed as high up as Wuhu because the Yangtze is strongly tidal up to that city. More usually Nanking is regarded as the apex. There is a strong case, however, for considering Chinkiang as the real head of the delta, since the river originally discharged its waters into the sea at this point.

## (2) *The Delta*

*Origins and Characteristics.*—The term delta is really a misnomer, for the area, although roughly triangular in shape, has very different characteristics from those of the classical delta of the Nile, built up in the tideless Mediterranean. It is essentially a filled-in bay, which was itself the result of subsidence, and one of the most interesting phenomena is the occurrence of isolated hills of ancient rock, which rise sharply out of the alluvium, and which were formerly islands in the bay. Evidence goes to show that the subsidence is still in progress, but it is more than counterbalanced by the deposition of the Yangtze sediments. About 15% of the deltaic area is still occupied by lakes of which the Tai hu is the largest; these lakes may be regarded as remnants of the former bay, and analogous to the Norfolk Broads.

The greater part of the delta has been formed within historic times. The earliest records, such as those of 'The Tribute of Yü', show that, long after most of the North China Plain had become settled and cultivated, the region of the Yangtze mouth was mainly a swamp. A reference to it by Ssü-ma Ch'ien, the Han historian, points to it still being in the early stages of reclamation nearly as late

as the beginning of the Christian era. The oldest and earliest settled parts were to the west around Tai hu in the neighbourhood of Soochow. What is now the large island of Tsungming, with a population of over three-quarters of a million, began its career as a sandbank in the seventh century, and was first definitely settled in A.D. 1277. The great peninsula of Haimen, to the north of the

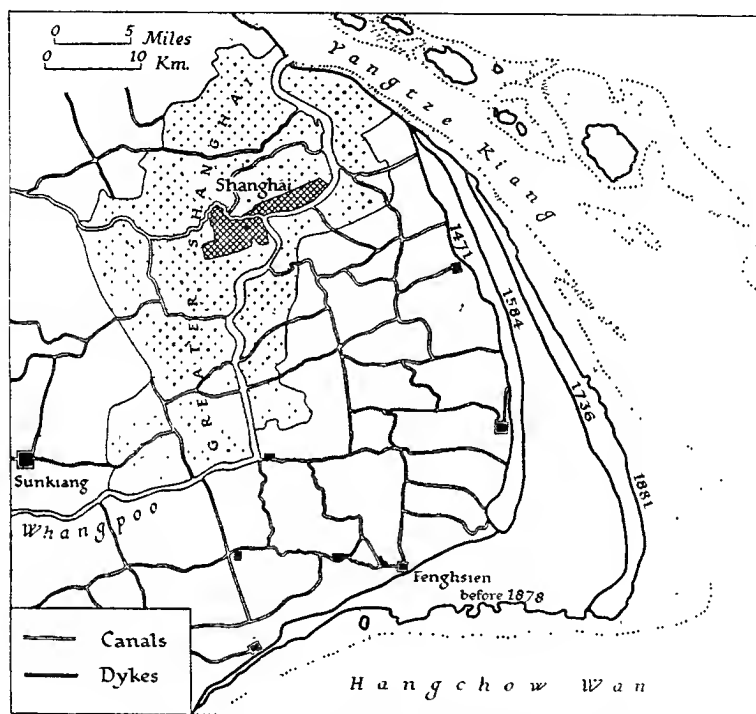


Fig. 32. Canals and sea dykes, Yangtze delta

Based on Cressey, G. B., 'The Fenghsien Landscape', *Geographical Review*, vol. xxvi, p. 398 (New York, 1936).

In Shanghai, the International Settlement, the French Concession, and the old walled Chinese city are cross hatched. The dykes show the steady advance of the land: inside them all canals drain to the Whangpoo.

present mouth, has a similar history. The shoreline is still being built seawards at a rate of about a mile in rather less than seventy years.

Natural processes have been so greatly assisted by human effort that the delta, as seen today, may be regarded as largely man-made. The onslaught of the strongly tidal sea has been prevented by the construction of dykes (Fig. 32). There have been many vicissitudes,

and there are accounts of dykes being abandoned and rebuilt farther inland than is shown on Fig. 32, but at any rate from the fifteenth century the margin of the land has been steadily advanced at the expense of the sea. This has been made possible by the tremendous load of deposits brought down by the Yangtze; the deep staining of the sea several miles out from the shore is the most impressive evidence of this load.



Fig. 33. Area recently reclaimed on the shores of Hangchow wan

Based on Cressey, G. B., 'The Fenghsien Landscape', *Geographical Review*, vol. xxvi, p. 401 (New York, 1936).

The canal network has a planned regularity similar to that of the polders of Holland. Note the single house existing in the area.

*Land Reclamation and the Canal System.*—The dyke of A.D. 1471 (Fig. 32) is made entirely of earth and is nearly 10 ft. high on the inner side and nearly 17 ft. wide on the top. The land on the seaward side continued to receive flood silts after the construction of



the dyke and in consequence its level is more than 3 ft. higher. Some of the more important dykes of later construction are shown in Fig. 32, but there are many others.

A distinction may be drawn between the older and the newer settled areas of the Yangtze delta. Comparison of Figs. 33 and 34 shows a marked difference in plan. In the area most recently

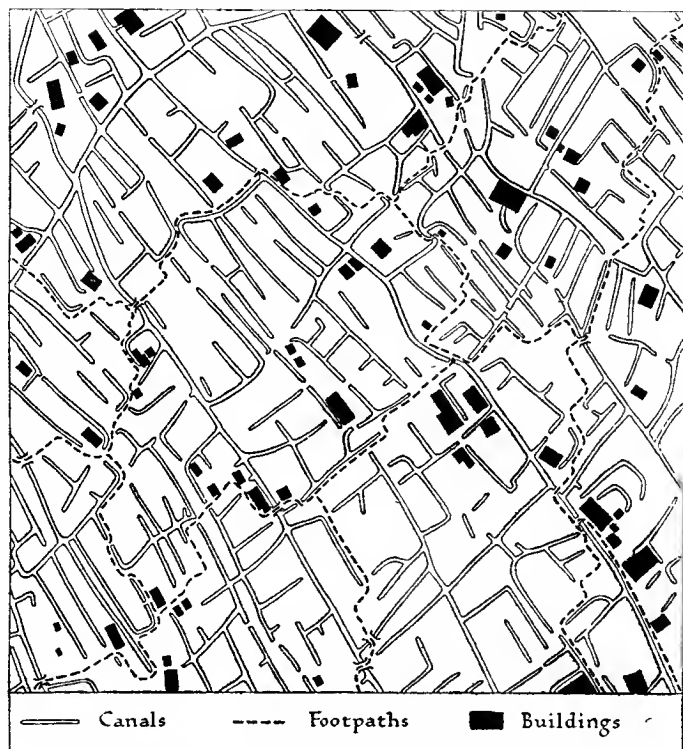


Fig. 34. Canal system in one square mile of the Yangtze delta, south-east of Shanghai

Based on a map compiled by the Whangpoo Conservancy Board, in Cressey, G. B., *China's Geographic Foundations*, p. 285 (New York, 1934).

The average distance between waterways, most of which are navigable, is 380 ft. Though presenting a generally rectangular pattern, this long-settled area lacks the obvious planning shown in Fig. 33.

reclaimed (Fig. 33) the canals follow a very regular rectangular pattern, presenting a landscape comparable with that of the Dutch polders. The main dykes are connected by lateral channels and only one house exists. The ground water is reported to be still saline in



Plate 51. The Lu shan

The Lu shan (Kuling range) in winter from the Yangtze plain : rice paddies are seen in the foreground



Plate 52 Bridge at Soochow, Kiangsu



Plate 53 The Yangtze delta  
This aerial view of the country near Shanghai shows the  
delta plain, canals and settlements surrounded by trees.



Plate 54 Dyke of the Yangtze near Tungchow, Kiangsu  
The dyke serves as a rough but useful road.

the outer parts of this reclaimed area, but drainage will steadily remove the salts and make rice cultivation possible. The older area of settlement, near Shanghai (Fig. 34), has a less sharply rectangular pattern. While communication is still mainly by water, there are a number of footpaths and bridges. Some of the canals are small independent stretches of water, linked with the main system by portages. Although the main canals are tidal, they seem to depend also on ground water. The small independent canals depend entirely on this source, and are the first to suffer from drought. During the protracted drought in the summer of 1932, many of the smaller canals were nearly dry, and others became so shallow that navigation was hindered.

Many of the canals are fringed by reeds and some of the earlier ones are partly obstructed; most, however, are navigable for farm skiffs, and some are sufficiently wide and deep for steam launches from Shanghai to penetrate large parts of the delta. In general the banks are from 4 to 7 ft. high, and the canals from 5 to 50 ft. wide. Few fields in the delta are more than fifty feet from a canal or a rain-water pond. The canals have many uses besides navigation. They are usually the sole source of drinking water, which is invariably boiled. They carry off surplus rainfall, and provide water for irrigation. The daily rice and vegetables are washed in them, and here the famous cormorants dive for fish, which they are prevented from swallowing by rings placed around their necks. Surplus water in the outer polders is drained to the sea at low tide through sluice gates.

In such a landscape as this it is now impossible to trace the original drainage lines. From Hangchow to Shanghai there is an unbroken succession of dykes. It is the people who have made the landscape, and in the words of a recent writer they 'are inescapable—old scholars giving their birds an airing, children tending the buffaloes, women weeding the crops, boatmen punting their shallow skiffs, groups of men and boys operating an irrigation pump. From dawn till dusk people are busy in the fields' (Plates 53, 54).\*

*Land Utilization.*—The maintenance of fertility is carefully safeguarded. The alluvial soil is a silty loam which is sufficiently fine to permit flooded ricefields to retain their waters for several days. This soil is constantly replenished by the application of canal muds, compost, and human waste. The farmers cut the vegetation

\* Cressey, G. B., 'The Fenghsien Landscape,' *The Geographical Review*, vol. xxvi, p. 402 (New York, 1936).

growing in ponds with scythes attached to long poles, and, with long-handled scoops, drag up the rich mud, which they use to fertilize their fields. Intensive cultivation is characteristic of the delta, with rice and cotton as the most important summer crops, and wheat and broad beans dominant in winter (Fig. 35).

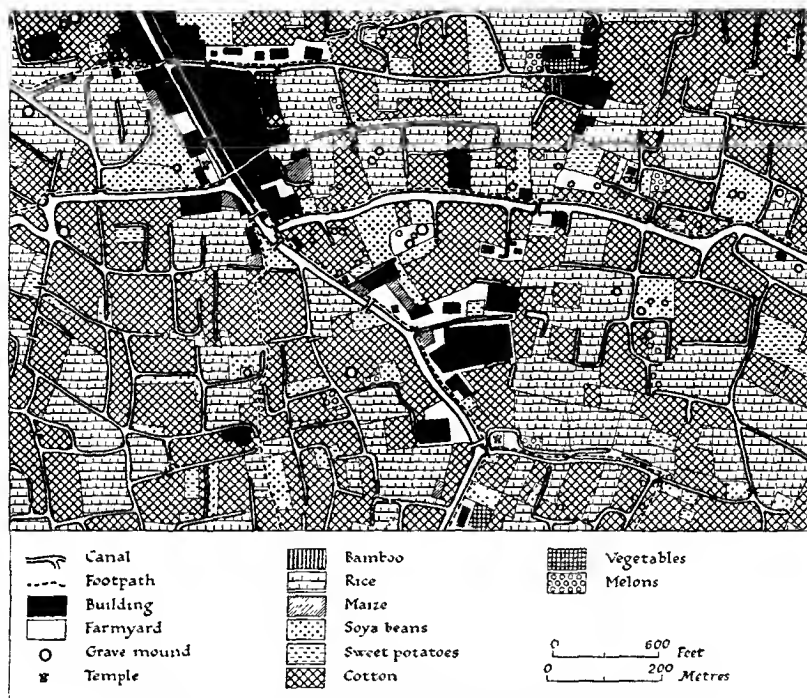


Fig. 35. Land utilization near Fenghsien, Yangtze delta

Based on Cressey, G. B., 'The Fenghsien Landscape', *Geographical Review*, vol. xxvi, p. 407 (New York, 1936).

This map covers nearly half a sq. mile and shows the intensity of settlement in the delta. Rice and cotton are the dominant crops; communication is chiefly by canals.

In the delta man has achieved a way of living which maintains natural fertility and which removes the fear of flood and drought, so menacing in many parts of the country. Further reclamation is possible, but even unreclaimed areas below the high-water mark have their use, for the high tides leave behind a layer of salt-impregnated silt. The top surface is scraped off and placed in basins into which water from ponds or creeks is poured. This water

dissolves the salt and seeps slowly into a cistern. The brine is then collected and allowed to evaporate in wooden trays, and the crystal salt which then accumulates is a valuable commercial product.

*The Yangtze Delta and the National Life.*—Although the canals provide for its teeming rural population their principal means of transport, the delta is now traversed by modern roads for long-distance traffic ; moreover, in addition to the main line to Nanking, Shanghai has been linked by rail with the Chekiang portion of the plain around Ningpo and Hangchow. It is thus in direct connection with the new east-west railway to Kiangsi and Hunan.

The delta, indeed, presents a most curious and rather incongruous combination of antiquity and modernity, the latter seldom in its most attractive forms. The life of the intensively cultivated and (before the Japanese invasion) comparatively prosperous countryside is still essentially that of old China—although even there the effects of industrialization are sometimes apparent. There are also ancient and typically Chinese cities such as Soochow, 'the Venice of China', the beauty of which is recorded in the well-known native adage : 'Heaven above ; Soo(chow) and Hang(chow) below !' Intermixed with these are new manufacturing centres such as the silk town of Wusih and (developed round an old nucleus) the vast industrial and commercial metropolis of Shanghai, with its three municipalities—the International Settlement, the French Concession, and the Chinese 'Greater Shanghai' (Fig. 32 and Plate 52).

The circumstances under which modern industrialism was introduced into China by the West naturally led to its concentration around this great gateway of the Yangtze basin, and the development of manufactures of modern type was localized to an amazing extent in the delta. Of an estimated pre-war total of 3,849 factories in China, no fewer than 1,290 were in Shanghai and a large proportion of the remainder in its immediate hinterland. The Japanese invasion and occupation of this part of China have ended so one-sided a development. The removal of many factories from the east to the west, and the growth of new industries in Kiangsi, Hunan, Shensi, and, most notably, in Szechwan have already gone far to equalize the distribution. The geographical advantages and position of the Yangtze delta are such that it will almost inevitably regain its primacy when China is once more in possession of it, but not to the extent of recovering the dominance which it exercised before. Nor can it be assumed with any certainty that Shanghai itself will always be the major port and directing centre of the Yangtze outlet. Only

in recent times has the Whangpoo, upon which Shanghai stands, become the main artery, and only with difficulty has its accessibility to great ocean liners been maintained. In the past, other ports have served as the maritime emporia of Yangtze trade, and the possibility of new developments cannot be excluded (Plates 55, 98).

### (I) THE HANGCHOW BASIN

This is a relatively small but important region which includes most of the northern half of Chekiang, itself the smallest of all the provinces of China. It is the only district of Central China outside the actual basin of the Yangtze, but is closely connected with it and serves as a vital link between two of its most important but widely separated parts, the delta on the one hand, and the southern portion of the Central Basin in Kiangsi and Hunan on the other.

It is based on the valley of the Tsientang kiang which opens into Hangchow wan, just below the historic city of that name. This river flows through hilly and very beautiful country which has most of the characteristics of the South-Eastern Uplands (see p. 114). It should, however, be clearly distinguished from that region, the master rivers of which are walled off from the southern basin of the Yangtze by high fault-scarps, presenting great obstacles to communication. These rivers flow south-eastwards across the grain of the country to independent outlets on a broken and mountainous coast. The Tsientang, on the contrary, is a longitudinal stream flowing from south-west to north-east, parallel to the Lower Yangtze valley, from which it is separated by the Hwang shan and other ranges of south-eastern Anwhei ; its seaward end is virtually the southern fringe of the Yangtze delta. The river itself is of comparatively little use for navigation, but its valley provides the only easy passage for an east-west route in the entire stretch between Shanghai and Canton. Hence it has been selected as the route for the important new railway connecting Hangchow and the whole delta with Kiangsi and Hunan and ultimately with Kweichow and Yunnan (see p. 98).

The hilly country drained by the Tsientang is very attractive, and, on the whole, fertile. The forests here have been better preserved than in most parts of China, and in recent years some systematic reafforestation has taken place ; hence there is little of the excessive gullying of hill slopes which has so largely ruined many of the upland areas of the country. The hills to the south of Hangchow are



Plate 55. The Bund, Shanghai



Plate 56 The Hangchow bore

The bore is seen advancing up the Tsientang estuary





Plate 57. Tea plantation, Chekiang

This modern tea plantation and factory is in the hilly country of the Hangchow Basin; it is served by a modern road.

frequently terraced and grow some of the most celebrated varieties of tea. There are also a number of intensively cultivated valleys and basins. The largest and most important of these is the Kinhwa basin in the heart of Chekiang, reached by a southern tributary of the Tsientang. This basin is developed in soft rocks, mainly consisting of Tertiary shales and sandstones and is aligned from north-east to south-west with a total length of about 100 miles and a width varying from two to ten miles. The railway makes a detour to the south from the main valley to tap this rich basin (Plate 57).

Chekiang as a whole, though the smallest, is second to Kiangsu as the most densely peopled province of China and has long been one of the most progressive. Hangchow, the provincial capital, is near the mouth of the Tsientang, where one of the most notable of tidal bores is produced by the current sweeping up the funnel-shaped estuary; it is a large city of half a million people and still perhaps the most beautiful in China (Plate 56).

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## Chapter V

### SOUTH CHINA

Introduction : The South-Eastern Uplands : The Nanling Belt : The Canton Delta and Central Kwangtung : South-Western Kwangtung and Hainan : The Kwangsi Basin (or Kwangsi Platform) : The South-Western Tableland (Yunkwei Plateau) : Bibliographical Note.

#### INTRODUCTION

South China includes all of China proper lying to the south and south-east of the major divide of the Nanling and its north-eastward continuation by the Wuyi shan to the coast south of Hangchow Bay. This is almost, but not quite, equivalent to saying that it lies to the south of the southern watershed of the Yangtze (Figs. 36, 37).

The large area so defined has none of the unity which characterizes North China or Central China. There are few if any broad generalizations to be made about its physical or its human geography such as have been made of both North and Central China. It contains two large and distinctive regions in the South-Eastern Uplands and the South-Western Tableland (the Yunkwei Plateau of Chinese geographers), but in nearly all respects they are very unlike each other, and there are no natural links between them. In the intermediate area lie a number of smaller regions, such as the Kwangsi Basin (or Platform), with special characteristics of their own. There are likewise in South China many varieties of climate and vegetation, although the recent researches of Chinese botanists have shown that there is more in common between the floras of the south-east and the south-west than was formerly supposed.

Although South China contains the only really tropical parts of the country it cannot be described as dominantly tropical. The lofty plateaux of Yunnan and Kweichow and much of the Nanling belt have conditions approaching temperate. The truly sub-tropical or tropical climate is restricted to very limited basins and valleys in the south-east and along the south coast of Kwangtung, to the island of Hainan and to the deep jungle valleys incised in the South-Western Tableland.

The different parts of South China are not knit together and integrated as are those of Central China by the great waterways which the Yangtze system provides. The Si kiang is an important river, but it is a first-class waterway only below Wuchow in the



Fig. 36 The Lower Yangtze Valley and South-east China  
Based on *New Atlas of China*, plates 31, 39, 45 (Shanghai, 1934).

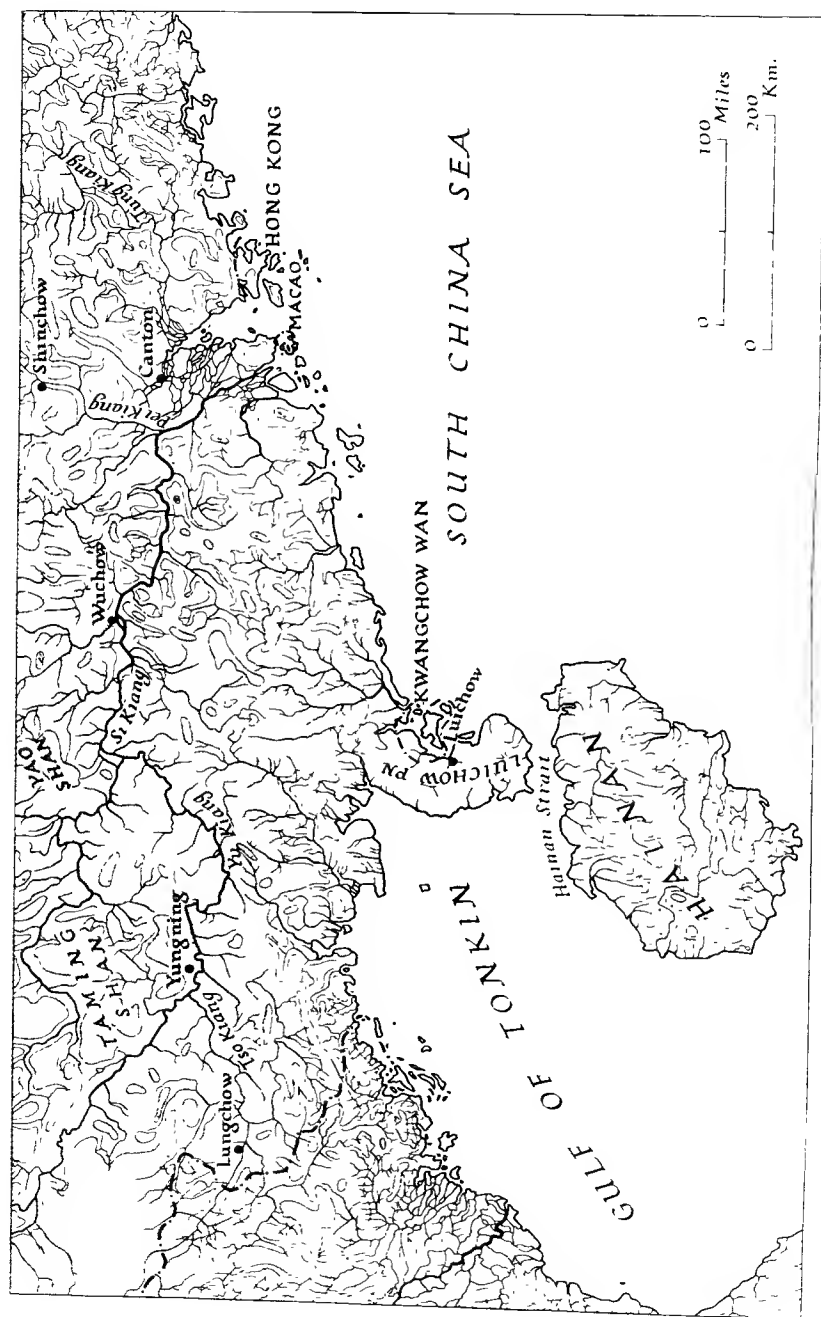


Fig. 37. Kwangtung and Kwangsi  
Based on *New Atlas of China*, plates 43, 45 (Shanghai, 1934).

extreme east of Kwangsi, and it is greatly inferior to the Yangtze as an avenue of approach to the west. It has no great interior basins comparable to the Central Basin or the Red Basin, and, at its seaward end, Canton is a focus for only a part of the south-east.

The human geography presents the same kind of picture. There are many types of production and rural economy in accordance not only with the varying physical conditions but with the very different origins and social types of its peoples. In no respect is the diversity of South China more remarkably shown than in the great variety of its spoken languages. Throughout the whole of North China and over by far the greater part of Central China, Mandarin, with some dialectical differences, is the everyday language of the people. In South China Mandarin is spoken in parts of Kwangsi, Kweichow and Yunnan, but over most of this area there is a great diversity of tribal languages and dialects, spoken by the aboriginal peoples. The south-east, on the other hand, is the domain of the non-Mandarin varieties of Chinese, of which there are three main groups, Wu, Fukienese and Cantonese (Fig. 122); the Fukienese group is itself split up into at least two major dialects (Foochow and Amoy-Swatow) and a great many minor ones (see p. 115).

South China is therefore far from being a geographical entity or major region. Its keynote is diversity. For the purposes of description the best division of this complex area is into the following regions :

- (J) The South-Eastern Uplands.
- (K) The Nanling Belt.
- (L) The Canton Delta and Central Kwangtung.
- (M) South-Western Kwangtung and Hainan.
  - (1) South-Western Kwangtung.
  - (2) Hainan.
- (N) The Kwangsi Basin (or Kwangsi Platform).
- (O) The South-Western Tableland (Yunkwei Plateau).
  - (1) The Kweichow Plateau.
  - (2) The Yunnan Plateau.

### (J) THE SOUTH-EASTERN UPLANDS

The South-Eastern Uplands, which comprise the eastern third of Kwangtung, the whole of Fukien and the south-eastern half of Chekiang, is a region of very distinctive character which has had a peculiar and important role in the development of China. It should be noticed that the term 'uplands' is used in contrast to the lofty and much younger 'highlands' of western China; indeed, the ridges of the south-east are only stumps and remnants of much

higher mountain chains which have been worn down by erosion. They are comparable in elevation, however, to the most mountainous parts of Great Britain and the term 'uplands' is open to misconception if interpreted by British standards (Fig. 36).

### *Structure and Relief*

The South-Eastern Uplands belong to the same series of ancient blocks or uplifts as the Liaotung-Shantung massif in the north (see p. 17) but they have had a more complex physical history. The rocks of this region have been repeatedly compressed into a series of parallel upfolds and downfolds with their axes aligned from north-east to south-west; this Cathaysian trend is dominant throughout and all the mountain-building movements which have affected the region have had the same broad results. Its western edge is very clearly defined by impressive fault-scarps with their steep faces to the southern basin of the Yangtze. These scarps merge in the south-west into the eastern Nanling, gradually assuming an east-west direction on the borders of Fukien, Kwangtung and Kiangsi. On the north-east, they trend through central Chekiang towards the coast south of Hangchow wan, and their real termination is in the numerous islands of the Chusan archipelago (Plates 58, 97).

It is unfortunate that this high and precise western edge has, as yet, no single name which is generally accepted. The term employed in this handbook to describe it is that of the Wuyi shan, but locally this name is limited to the central section which forms the northern part of the long boundary between Fukien and Kiangsi. Farther south, the Tachin shan is the name most often used, while the connecting link, which gradually bends westwards to join the Nanling, is known as the Shaling.

These western scarps are the highest part of the region, reaching more than 6,000 ft. in western Fukien and the adjacent part of Chekiang. They form the water-parting between the drainage of the Kan in Kiangsi and of the Tsientang in northern Chekiang and that of the numerous rivers flowing south-eastwards into the East China sea and the Formosa channel. The few passes over the scarps are high and difficult, and they constitute a formidable barrier between the southern Yangtze basin and the densely peopled coastal fringe of Chekiang, Fukien and eastern Kwangtung.

On the seaward side of the Wuyi shan (used in its widest sense) the many parallel ranges tend to be more compressed and crowded towards the west, and to broaden towards the coast. The strata



Plate 58. Tongtung tao, Chekiang

This is characteristic of many rocky islets in the Chusan archipelago.



Plate 59. Yung kiang near Kikow, Chekiang

The river flows in a narrow valley flanked by low wooded hills and is extensively used for local transport. A small river settlement is seen on the right.





Plate 60. Valley in the Yentang shan, Chekiang

A steep-sided valley of the South-Eastern Uplands with forested hills and cultivation on the alluvial lowlands of the valley floor.



Plate 61. The Yentang shan, Chekiang

This narrow limestone gorge has fantastic rock pinnacles, with cultivation on the valley floor and scattered trees on the talus slopes to the left

are highly folded and are often faulted both along and across their strike, which further complicates the local details of relief.

The rocks involved in the various movements which have affected the region range from Archæan gneisses and schists through Permian limestone, Jurassic sandstones and shales, to Cretaceous red and purple sandstones. There is evidence of folding at several different periods, but the main phase seems to have been towards the end of the Jurassic, which was followed by more moderate folding of the later Cretaceous beds. Overlying these, and unconformable to them, are red clays and conglomerates believed to be of early Tertiary age (Plates 60, 61).

The region has experienced many phases of igneous activity, the last of which is represented by basalt along parts of the coast; an outstanding feature, too, is the widespread occurrence of intrusive granites and rhyolites, particularly in the coastal zone.

The river drainage has a very distinctive pattern. All the major rivers rise in or near the high western border, and follow a southeasterly course to the sea across the grain of the country, cutting through the various north-east to south-west ranges in deep gorges; their tributaries, on the other hand, drain the longitudinal valleys which are often fairly wide and open. The result is one of the best examples in the world of the trellis pattern of river drainage, particularly well illustrated by the Min system in central Fukien with its outlet at Foochow. To the north of the Min, the chief river is the Wu, which flows out at Wenchow in southern Chekiang; to the south of the Min are the Kiulung and the Han, with their outlets at Amoy and Swatow respectively. It follows from the character of their courses that navigation on the main rivers is very much impeded by rapids; on the other hand, their tributaries frequently have long navigable stretches for junk traffic (Plate 59).

The coastline is extremely intricate, the result, to a large extent, of subsidence. The lower valleys of the main rivers are drowned, and there are numerous bays and outlying islands in profusion, from the Chusan archipelago to Hong Kong and the islets which fringe the Canton delta. The largest deltaic area within the region itself is that of the Han, which covers about 600 sq. miles around Swatow, Chaoyang and Chaochow, and which is drained by a network of canals (Plate 97).

To the west of the Han delta the character of the country and the alignment of the hills and of the coast begin to change. Whereas the boundaries of the South-Eastern Uplands are very clear on the side

of the Yangtze basin and on the north-east, the southern border is difficult to define, but corresponds approximately to the watershed between the Han kiang and the Tung kiang, which has its outlet in the Canton delta.

### *Settlement and Resources*

The human geography of the region is related with a quite impressive clearness to the physical features. Although some of the interior valleys are well cultivated and peopled, and some of the best tea in China is grown on the slopes of the Wuyi shan, the great bulk of the population is concentrated in the lower valleys and deltas of the main rivers, and around the bays and inlets of the highly articulated coast. Here, on fertile alluvial soils and with a sub-tropical climate, agriculture reaches a high pitch of intensity. Much of this coastal zone comes within the limit of the double cropping of rice, and wheat and other winter crops follow the second rice crop. These rich deltas and valleys, however, are very limited in size, and there is a constant tendency to excessive parcelling of the land and to overpopulation. The Min delta is so overcrowded that a considerable population lives permanently on boats in the river and in the harbour of Foochow. Relief, however, comes in two ways—from the rich fisheries and from the abundant forests, which, at least in Chekiang, are preserved with some care and yield timber for large junks and smaller boats. The whole coast has long been a school for seamanship and supplies the majority of Chinese sailors; it will be the chief reservoir for the large mercantile marine which China hopes to develop after the war (Plates 58, 97).

Equally important is the close connection which the ports of Fukien and Kwangtung have long had with Malaya, Thailand, Indo-China and other parts of the South Seas. Emigration has here been more than a palliative, for, prior to the war and particularly before the great economic depression of the early 'thirties', the large remittances of the many successful emigrants to their families at home was a major factor in maintaining relative prosperity in the coastal zone. The whole outlook of the region is essentially maritime. Communication even with the interior valleys has not been easy, and with Central China beyond the Wuyi shan very difficult indeed. There is no through east-west railway south of the Hangchow-Kinhwa-Nanchang line (see p. 109) and the road map of China on the eve of the Japanese war (which was preceded by a period of active road construction) shows no major route across the

Wuyi shan between the latitudes of Wenchow and Canton, with the exception of one from Amoy to Kanchow in Kiangsi.

Useful minerals, such as alum in Chekiang, are derived from some of the rocks, but the mineral resources of the region cannot be compared with those of south-west China with its wealth of non-ferrous metals, or with those of the north-west with its vast coalfields. The coalfields of the South-Eastern Uplands are small and restricted to isolated troughs within the general mass of older rocks; the most important are in Fukien and include the Anki bituminous field not far from the coast, and the Lungyen and other anthracite fields nearer the Kiangsi border. The combined coal reserves, however, of the three south-eastern coastal provinces of Chekiang, Fukien and Kwangtung form less than half of one per cent. of the estimated total for China.

The prospects for iron-ore production are still rather uncertain. The original estimates of the Geological Survey placed the reserves at a very low figure, but they were raised as a result of fresh investigations in Fukien before the present war with Japan. There is at least one important magnetic mass at Anki in that province.

### *Linguistic Diversity*

The effect of the physical features on the linguistic position of the region is also very striking. The major linguistic divide in China, that between the Mandarin and non-Mandarin forms of spoken Chinese, follows the Wuyi shan fairly closely. Within the region itself, the chief varieties of the latter group tend to correspond to valley systems separated from each other by rugged mountain tracts. Thus the Foochow dialect, the most important of the Fukienese group, is the language of the Min basin. It differs very considerably from the Amoy dialect of the Kiulung valley which, it should be noticed, is also spoken in Swatow and the Han valley in eastern Kwangtung, where the inhabitants are descendants of settlers from the Amoy district of Fukien and are called Hoklos (see p. 418). In Chekiang the Wu dialects prevail, extending northwards into the Yangtze delta (Fig. 122).

In Fukien, however, where the relief is most intricate and the isolation greatest, linguistic diversity reaches its climax, and there are said to be over 100 minor dialects within the province. This great linguistic complexity is the result of the isolation of the valleys which have been little worlds to themselves and have fostered a strong particularism. The emigrants to Hainan and Malaysia, and

the seamen also, fall into distinct groups corresponding to the linguistic divisions. This diversity of tongues along the south-east coast, which has been the part of China perhaps best known to Westerners, has tended to give a wrong impression of the linguistic position in the country as a whole; on a broad view the relative linguistic uniformity of the north and the centre is quite as striking as the diversity of the south-east (Plate 62).

With the quickening of the national consciousness *Kuo Yü*, the national language based on Mandarin, has made considerable progress in the south-east in recent years (see p. 458); the development of communications after the war will gradually break down its isolation from the interior of China.

### (K) THE NANLING BELT

#### *Structure and Relief*

The Nanling is the most southerly of the three great mountain belts which traverse China from west to east (see p. 18). Although not on the same majestic scale as the Central Mountain Belt which separates North from Central China, it is sufficiently broad and massive to form a distinct sub-region. It has had a more complex physical history than the Tsinling which maintains an easterly direction for an immense distance and which suffers no deflection until it reaches central Honan. The Nanling axis, on the contrary, is frequently deflected, and, although its general direction is clearly west-east, its course is extremely sinuous. The work of Chinese geologists in recent years has shown that this complexity is the result of the intersection of the west-east thrusts and the typical Cathaysian north-east to south-west trends displayed by so many mountain ranges in China. On a broad view, the Nanling represents an adjustment to these two main lines of folding, with the former predominating. The geological evidence seems to show that important folding along east-west axes took place in late Mesozoic times, and that this was contemporaneous with similar movements in both the Tsinling and the In shan (see p. 78). In south-east China, however, as has been emphasized in the preceding section on the South-Eastern Uplands, the Cathaysian trend becomes completely dominant and the west-east axis of the Nanling is bent round through the Shaling into the north-east alignment of the Wuyi shan.

From this junction with the South-Eastern Uplands the Nanling proper extends westwards into Yunnan, a distance of at least 800



Plate 62. A mountain village, Fukien

Parts of the little-known interior of Fukien are inhabited by aboriginal tribes. Two settlements and terrace cultivation in forest clearings can be seen



Plate 63. Vegetation on the southern slopes of the Nanling

On the southern slopes of the Nanling sub-tropical forest with dense bamboo thickets occurs up to 3,000 ft.



Plate 64. The Nanling in northern Kwangtung

Red sandstones are weathered by active erosion into isolated blocks ; small patches of cultivation are seen in the valley.



Plate 65. Ricefields, Canton delta

The ricefields are irrigated with water distributed by a canal system. Villages are hidden in the trees, while one of the characteristic low hills of the delta appears in the background.

miles, and it may be broadly divided into three main sections: western, central and eastern. The western Nanling, which separates the very different landscapes of the Kweichow plateau and the Kwangsi Basin, follows a mainly west-east direction, and so does the eastern Nanling from about long.  $113^{\circ}\text{E}$  on the borders of Kiangsi and Kwangtung to the junction with the South-Eastern Uplands. It is in the central section that the Nanling attains its greatest width and complexity and shows most clearly the displacements and changes of direction which result from the intersection of different lines of folding. On the borders of eastern Kwangsi and south-west Hunan, the main ranges bend abruptly southwards for more than 60 miles, just to the east of the Kweilin pass before resuming an irregular west-east trend on the borders of Hunan and Kwangtung. Another southwards displacement occurs to the east of the Meiling pass. In all this central portion too there are numerous subordinate ranges, sometimes almost at right angles to the main chains. The southern projections of Hunan and Kiangsi lie in this intricate and confused mountain country.

The rocks found in the Nanling Belt are extremely varied. Ancient sedimentary formations, often metamorphosed, form the axis of the range over most of its length, but granites are also widely exposed and with these are associated such minerals as tin, copper, zinc, antimony and wolfram. In the central Nanling, between the Kweilin and Cheling passes, many of the ranges are formed of massive Cambrian quartzitic sandstones with Devonian limestone, eroded into karst topography, in the valleys. On either side of the main axis, later rocks are exposed—particularly red sandstones ascribed to upper Cretaceous or early Tertiary times. Several of the rivers have excavated their beds in these red sandstones and their valleys are sometimes sufficiently wide to form small cultivated lowlands within the mountain belt. On the whole, however, it is a thinly peopled region (Plate 64).

### *The Nanling as a Barrier and as a Divide*

As a barrier the Nanling is not comparable to the Tsinling. Its average altitude is much lower, seldom exceeding 3,000 ft.; its ranges are more discontinuous, and there are three major passes (the Kweilin, Cheling and Meiling) and several minor ones low enough to carry important routes from the Yangtze to the Si kiang basins. These have often been penetrated by armies, as in the case of the original conquest of South China under the Ch'in and Han dynasties



more than two thousand years ago ; the same routes in the reverse direction were used by the newly formed ' National ' armies under Generalissimo Chiang K'ai-shek when he moved northwards from Canton to the occupation of the Yangtze valley in 1926.

The Nanling is far more important as a divide than as a barrier, and in this respect almost rivals the Tsinling. Climatically it separates the sub-tropical lowlands of the Si kiang basin with their continuous growth of vegetation and double cropping of rice from the Yangtze basin with its cool winters and marked seasonal rhythm of crop production. The natural vegetation on the two sides of the zone is also clearly distinguished. Some tropical trees such as the banyan do not penetrate north of the divide. In broad terms, the forest to the south is definitely sub-tropical and the forest of the Yangtze basin primarily warm-temperate, but with an admixture of both sub-tropical and cool temperate species. The Nanling has a distinct mountain rain forest of its own which owes its richness to the high humidity, especially in spring, and heavy rainfall through most of the year. It has considerable timber reserves, but many hillsides have been eroded as the result of indiscriminate cutting and burning (Plate 63).

As a linguistic divide, the Nanling in its eastern and central sections is a continuation of the Wuyi shan, and it separates the Mandarin-speaking peoples of Kiangsi and Hunan from the Cantonese-speaking population of central Kwangtung. In the eastern Nanling where it merges into the South-Eastern Uplands live the interesting Hakka people with their distinctive dialect (see p. 418). There is an interesting transgression of Mandarin over the western Nanling into Kwangsi (see p. 128).

The crests of the Nanling throughout almost its whole extent form provincial boundaries, separating Kweichow, Hunan and Kiangsi, with their orientation to the Yangtze, from Kwangsi and Kwangtung, with their outlook to the Si kiang and the Canton delta.

The completion, just before the outbreak of the present war with Japan, of the railway from Hankow to Canton through the Cheling pass was an important event, whose significance in linking South and Central China and making possible the fuller exploitation of the mineral resources of the central Nanling will become apparent when peace is restored.

## (L) THE CANTON DELTA AND CENTRAL KWANGTUNG

*Origins and Characteristics of the Canton Delta*

The province of Kwangtung south of the Nanling (here locally known as the Tayuling) is hilly but is penetrated by the valleys of three large rivers which converge to a common delta, usually called after its chief urban focus the Canton delta. These major rivers are the Si kiang, the Pei kiang and the Tung kiang—i.e. the west, north and east rivers. A smaller, but still considerable stream, the Tam kong, comes in from the south-west. Some of these rivers must have originally had independent outlets, but a deep subsidence drowned their lower valleys, and they then flowed into a wide bay, which has subsequently been to a large extent filled in by their deposits and which now forms the so-called 'delta'. On the eastern side of Canton bay the Tung kiang, which drains a wide belt of country in eastern Kwangtung, south of the waterparting separating it from the Han kiang of Swatow, has built up a large deltaic plain of its own, but it can conveniently be included in a general survey of the Canton delta (Plates 66, 67, 68).

In many respects the Canton delta resembles that of the Yangtze (see p. 101). Both are in-filled bays rather than true deltas; both have isolated hills (which were formerly islands) rising sharply from the alluvium; the Yangtze, in the one case, and the four rivers converging on the Canton delta, in the other, are tidal. The rise and fall of the tide at Canton, 100 miles inland, is about six feet at its maximum. The submergence has been relatively recent and large remnants of the original bay remain. Thus, the Chu kiang distributary (often known as the Pearl or Canton river) opens out below the city into a broad island-studded gulf or estuary known as Canton bay. Sedimentation, however, is still actively proceeding, and unless changes of level occur, many of the islands on the fringes of the delta, including Hong Kong, will in the process of time be surrounded by alluvium. It has been suggested that the best term to describe this curious combination of alluvial plains, wide stretches of water and isolated hills and islands is that of the Canton 'embayment'. Certainly it more accurately indicates the actual position than the rather misleading title of 'delta'. The embayment as a whole covers about 3,000 sq. miles, of which approximately one-quarter is either water or hills and the remainder alluvial plains.

The main plain within the embayment is bounded by the Chu kiang or Pearl river distributary and Canton bay on the eastern

side and by the main artery of the Si kiang on the western side. This plain is about sixty miles long and twenty to twenty-five miles broad and is itself intersected by channels and canals, but its southern margins are hilly, and around Macao the rocky coast resembles that of the South-Eastern Uplands (Plate 90).

### *Settlement and Agriculture*

As in the case of the Yangtze delta, the Canton delta as seen today is largely a man-made landscape (see p. 102). It is now scarcely possible to discern which channels and creeks are due to reclamation or drainage control and which are of natural origin. It is, however, the deposition of silt along the estuaries and the original islands that has made steady and continuous land reclamation possible. The dykes are usually wide and marked by lines of fruit trees with some houses and narrow footpaths. Disastrous flooding of the rice lands as a result of the breaking of the dykes is not uncommon, and the fundamental cause is the congestion of the delta channels by the superabundant silt brought down by the rivers from eroded hillsides. Terrace cultivation, however, is now very common in the hilly country around the delta and is well adapted to the red sandstone which is the prevailing rock. The growth of the modern movement for reafforestation will also tend to check excessive soil erosion.

The Canton delta is one of the most intensively cultivated regions in the world. The two main crops are rice and the mulberry. Rice is the predominant product of the lower levels where conditions for irrigation are ideal and where the climate permits of two and three croppings; the total output is much higher than in Central China, although the quality is not so good. On higher ground, especially to the west of Taileung, mulberries take first rank, forming the basis of a silk industry. They are assiduously fertilized with canal mud and various types of manure, and the leaves are gathered six or seven times a year. A rich variety of supplementary crops is grown among the mulberry groves and paddy fields (Fig. 38). Fruits include bananas, pineapples and lychees, the last a great speciality of south-eastern China. Among many vegetables and fruits are aubergines and melons. Other crops include ginger, sugar-cane and tobacco. Ducks are raised in the paddies, poultry of all kinds kept in the gardens, and fisheries in the canals are skilfully associated with the mulberry-silkworm industry; the fish add to the fertilizing qualities of the bottom muds used as manure for the mulberries and in turn the waste cocoons feed the fish (Plate 65).



Plate 66. The hill country of Central Kwangtung near Tamshui

The disafforested hills surround cultivated lowlands ; a bamboo thicket is seen in the foreground.



Plate 67. The Canton delta

The rectangular field pattern is strongly influenced by the main and subsidiary canals along which the settlements are marked by clusters of trees.



Plate 68. Hills and valleys near Kowloon

The New Territories (Hong Kong) consist largely of wooded hills with small cultivated valleys sown mainly to rice. Part of the port of Kowloon is seen.



Plate 69. Riverside with house-boats, Canton

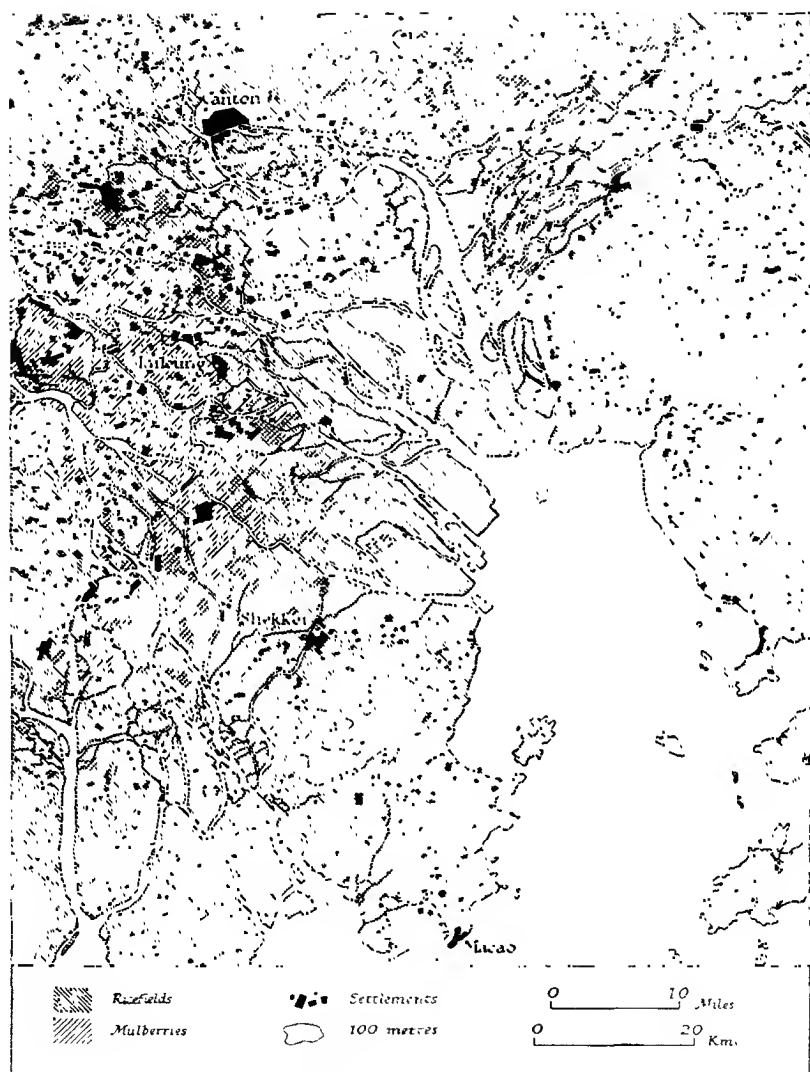


Fig. 38. The Canton delta

Based on 1 : 250,000 G.S.G.S. Series 3825, Hongkong and Canton (1938).

There are numerous small hills, some of which are tree-covered. The embanked areas are mainly ricefields, while mulberries are grown on slightly higher ground. Settlement avoids the lower land, much of which has been recently reclaimed from the sea.

The density of the population over the delta reaches the very high figure of 3,000 per sq. mile and primarily reflects the intensity of the agricultural production. The region, however, has great commercial significance as well and, apart from Canton, there are many large towns such as Fatshan, Whampoa, Taileung and Samshui.

Canton itself with a population of about a million, of whom it is estimated that 200,000 live on boats, is the great metropolis for all central Kwangtung. The city has long been the main outlet of the Si kiang avenue from the west, and is now also the terminus of China's trunk railway from Peiping via Hankow and the valley of the Pei kiang. The full realization of these advantages for the development of Canton as the chief distributing centre for South China has been hampered by the lack of facilities for accommodating large ocean liners. Before the war with Japan, however, strong efforts were being made to develop the harbour of Whampoa, on a branch of the Pearl river below Canton, as its ocean out-port (Plate 69).

No part of China has had such wide and intimate contacts with the outside world, and the Chinese saying that 'everything new originates in Canton' has been illustrated by the leading part which it has played in revolutionary movements of recent times. Cantonese is the most important of the non-Mandarin group of spoken languages and is spoken by nearly twenty million people. Its use extends over all central Kwangtung, which is so closely linked with the delta, and it reaches to the farthest limits of the province in the south-west and up the Si kiang valley into eastern Kwangsi. To the east of Canton, however, it is separated from the Swatow-Amoy Fukienese dialect area by an intrusion to the coast of the Hakka dialect from the mountains of eastern Kwangtung (Fig. 122).

#### (M) SOUTH-WESTERN KWANGTUNG AND HAINAN

The grouping of this maritime belt of south-west Kwangtung with Hainan is partly on the ground of propinquity and administrative connections (Hainan being part of the province of Kwangtung) but also on the ground of similarity of climatic conditions and potentialities of production. Together they form the only really tropical (as distinct from sub-tropical) part of China, with the exception of some of the unhealthy valleys incised in the South-Western Tableland.

(1) *South-Western Kwangtung*

South-western Kwangtung is a long coastal zone of varying width extending from the Canton embayment to the international boundary between China and French Indo-China. It is separated from the Kwangsi Basin by a belt of hills which form the waterparting between the Si kiang drainage and that of a number of short rivers flowing to the South China sea and the Gulf of Tongking. About half way between the Canton and Red river deltas, the broad Luichow (or Neichow) peninsula, with a blunted southern coast similar to that of Korea, projects southwards for some seventy-five miles towards the island of Hainan from which it is separated by the shallow Hainan Strait, fifteen to twenty miles in width.

The physical features of this southern maritime belt of China are very imperfectly known. The low waterparting ranges, becoming higher towards the Tongking frontier, are the denuded remnants of an east-west range parallel to the Nanling and are principally formed of ancient folded rocks, metamorphosed by intrusive granites. They may represent another of the east-west thrust zones and be analogous to the Nanling and Tsinling, but are on a much smaller scale. The coastal belt to the south of them, including the Luichow peninsula, contains considerable areas of lowland, broken by low hills many of which are due to igneous intrusions. The largest of these lowlands is the Luichow plain on the north-eastern side of the peninsula to which it gives its name. This extends for twenty miles round the important Kwangchow wan which is protected on its outer side by Tunghai tao.

In spite of its largely lowland character, the maritime belt as a whole is not intensively cultivated nor thickly peopled. The soils, under the influence of torrential rains and a humid, tropical climate, are mainly red laterites and infertile, very different from the rich silts of the Canton delta. Much of the country is still forested, and cleared hill slopes, unless very carefully controlled, tend either to relapse into jungle or to be ruined by excessive soil erosion. The plains on the eastern side of the Luichow peninsula, and round Kwangchow wan, are the most highly developed parts of the zone. Rice is the dominant crop, with sugar-cane and sweet potatoes as the chief subsidiaries, but the climatic conditions are favourable for the production of spices, cassia and medicinal herbs which demand uniformly tropical conditions.

The region has suffered from isolation and poor communications, and in the past its bays and inlets have been notorious for piracy.



There is now, however, a coastal road linking it with Nanning on the Si kiang, the chief focus of southern Kwangsi, and with Samshui and Canton. The dominant dialect is Cantonese, but the region is not nearly so closely connected with Canton as is central Kwangtung. Its economic life is mainly centred on valleys and plains orientated to the Gulf of Tongking or to the South China sea. The rise of Haiphong in French Indo-China has much reduced the importance of Pakhoi, formerly the chief port of the region; in recent times, however, the main centre of activity has been Kwangchow wan, leased to France by China in 1898.\*

## (2) *Hainan*

This large island of approximately 13,000 sq. miles (i.e. nearly twice the size of Wales) is administratively a part of Kwangtung, and its name means the district 'south of the sea'. Enough is known of its geology and relief to show that its physical history is closely linked with that of south-eastern China. It is aligned along the typical north-east to south-west Cathaysian axis with a total length of about 160 miles and an average width of about ninety miles. It is essentially mountainous, and the central range (the Wuchi shan) reaches nearly 5,500 ft. Alluvial plains are restricted to narrow coastal margins, widest and most important on the north where they face the mainland across the Hainan Strait. Scattered hills formed of igneous intrusions, similar to those of south-western Kwangtung, occur on these plains, which are often fringed by sand-dunes. The mountains of the interior are largely granitic, but there are old volcanoes on the north of the range and young basalts, probably of early Tertiary age, occur as in many parts of the coastal provinces of south-eastern China (Plates 70, 71).

The island experiences the full force of the summer monsoon and has one of the highest rainfalls in China. The mountains are sufficiently high to make a climatic difference in winter between the northern coastal plains, which then experience the relatively cool north-east monsoon, and the southern parts which are uniformly hot.

Hainan has technically belonged to China since its conquest by one of the generals of the Emperor Wu Ti of the Han dynasty in the second century B.C. and more or less effectively since the time of the Yuan dynasty (1275-1368). European ships have sailed in sight of its shores for generations and, in more recent times, Hoikow, the

\* For full information on the French territory of Kwangchow wan, see the N.I.D. Handbook on *Indo-China*, pp. 483-4 (1943).



Plate 70. Wuchi shan (Five Finger mountains), Hainan

The mountain is over 5,000 ft. high. The lower slopes of the densely forested toothhills have terraces for rice cultivation which is also seen on the valley floor.



Plate 71 The Limu shan, central Hainan

Rolling hills, of which these are typical, cover a large area in central Hainan



Plate 72. Ricefields and forest, Hainan

Flooded ricefields on the valley floor are surrounded by hills with luxuriant sub-tropical vegetation.



Plate 73. Forested uplands, Hainan

The mountains of Hainan are usually forested almost to the summits ; coniferous trees predominate here.

out-port for the capital, Kiungchow, on the northern plain, has been a port of call on the regular steamship service from Hong Kong and the South China ports to Haiphong. In spite of these facts, the interior has remained almost a *terra incognita* and even the coasts are imperfectly known. The very restricted area of alluvial lowlands suitable for the traditional agricultural methods of the southern Chinese, and the inaccessibility of the rugged and densely forested highlands, have been the main causes of this neglect. For long the main use of Hainan to China was as a penal settlement, and it was also a safe hiding place for refugees. There is now, however, a considerable Chinese population (about two millions) on the marginal plains, and rice, their chief crop, finds a ready market in South China. The Chinese are mainly of Hoklo origin (see p. 418), and the prevailing dialect is not Cantonese but that of Amoy and Swatow, together with Hakka. The interior highlands are inhabited by various groups of aborigines (Fig. 121), some of them primitive hunters and some relatively civilized. There is also an important half-caste element, and upon this probably largely depends the future economic exploitation of the unhealthy interior valleys.

In the decades before the Japanese war there was a marked increase of Chinese interest in Hainan, and a growing appreciation of its economic possibilities. Its rich flora was being studied by Chinese and American botanists, and several tropical genera were recorded which were not known on the mainland. The great wealth of the island in tropical timbers, some of high commercial value, had been demonstrated and a successful experiment had been made in the introduction of rubber trees from Malaya and the establishment of rubber plantations, the product being marketed at Singapore. The island and the adjacent part of the mainland is the only part of the Republic with climatic conditions analogous to those of Malaya and thus suitable for the growth of 'equatorial' as distinct from sub-tropical products (Plates 72, 73).

The seizure of Hainan by Japan as a base for the occupation of Indo-China has further demonstrated the strategic importance of the island to the Chinese.

#### (N) THE KWANGSI BASIN (OR KWANGSI PLATFORM)

##### *Structure and Relief*

In area, the inland province of Kwangsi, in the centre of southern China, is very slightly larger than Kwangtung, which borders it on the east and south, and only one-tenth smaller than Great Britain.

It constitutes, however, a great physiographic entity. It is essentially the basin of the upper Si kiang, and within it the very numerous headstreams and tributaries of that system, coming from all points of the compass, converge to form a single trunk stream at Wuchow, in the extreme south-east of the province. They have their origin in a vast amphitheatre of high plateaux and mountains on or just beyond the borders of the province, and they carve deep valleys of varying width within the quite elevated tableland of Kwangsi itself (Plate 7).

It is in relation to these lofty plateaux and mountain chains around it—the Yunkwei Plateau on the west and north-west, the Nanling on the north and north-east, and the ranges which separate it from the coastal zone of south-western Kwangtung on the south—that Kwangsi can be described as a ‘basin’. The alternative name of ‘Kwangsi Platform’ describes the dominant character of the actual surface of the province, a table-land with an average elevation of nearly 1,000 ft., though in parts diversified by much higher mountain ranges (Plate 74).

Much of the tableland is composed of sandstone but even more of limestone. The erosion of the latter in the north-west and north-east, particularly in the country round Kweilin, the former capital, gives rise to a karst landscape which is famous throughout China. Here the platform is studded with precipitous pinnacles of limestone, often assuming fantastic forms of great beauty. The higher mountain chains, of old sedimentary or metamorphosed rocks, rise to 3,000 ft. and their alignments reflect the complex interplay of the north-east to south-west Cathaysian trends and west-east thrusts which have been already noted as characteristic of the central Nanling (see p. 117). The ranges in the northern portion of the province, such as the Tupangling, really form part of the Nanling Belt itself (Plates 75, 76).

The western part of the platform is at a higher level than the eastern, and the step upwards is marked by the Yao shan which trends north-north-east to south-south-west for nearly 150 miles. This range seems to continue that remarkable line of displacement, illustrated elsewhere by the Taihang shan (in Shansi), by the truncated eastern ends of the Tapa shan and the Gorge mountains and by the eastern scarp of the Kweichow plateau; this displacement has been already emphasized as the major break of slope in China (Fig. 5). This higher western portion of the Kwangsi Platform may be regarded as the transition to the Yunkwei Plateau of south-west China (see p. 130). The southern rim of the Kwangsi Basin is formed by an intrusive belt of granite stretching from the

border of Kiangsi into Yunnan and is associated with important mineralization (see p. 133).

### *The Routeways of Kwangsi*

The valleys of the rivers converging from the high amphitheatre to form the trunk stream of the Si kiang are the main routes within the province and also the chief links between south-west and south-east China. All the important cities of Kwangsi stand at critical points along them, especially at the numerous confluences. Wuchow, the chief commercial focus, is at the junction of the Si kiang proper with its chief northern tributary, the Kwei kiang, and below it the only first-class waterway in South China extends to the Canton delta, in spite of a difficult gorge close to the Kwangsi-Kwangtung border. The Kwei valley leads by Kweilin to the Kweilin pass through the Nanling into Hunan, a route which once rivalled those through the Meiling and Cheling passes and now carries a new railway of great strategic importance from the Central Yangtze Basin towards Nanning, branching from the Hankow-Canton line at Hengchow in Hunan province. Above Wuchow the two main forks of the Si kiang meet near Sünchow. The northern fork is formed by the junction of the Liu kiang and Hungshui kiang, whose valleys give access to Kweichow. The southern fork, the upper Si kiang proper, affords the principal route towards Tongking. Below the junction of the Yu kiang and Tso kiang stands Nanning, the modern capital of the province and the chief collecting and distributing centre for southern Kwangsi, the adjacent part of Tongking and part of the coastal zone of south-western Kwangtung. Nanning is one of the most important frontier towns in China, almost equal in significance to Lanchow in Kansu (Plates 77, 78).

Thus Kwangsi is essentially a land of route-ways, although their value is diminished by the frequent rapids in the rivers, which interrupt navigation, and by the gorge-like constriction of many of the valleys.

### *Settlement and Resources*

Agriculturally, Kwangsi is much less important than Kwangtung, and intensive cultivation of rice, sugar cane and other sub-tropical crops is mainly restricted to comparatively narrow and discontinuous belts in the valleys, especially in the east and south-east. The economic life of the province centres to an unusual degree in the river towns and their immediate vicinities. On the rather desolate

uplands very little water is available for irrigation. Fortunately, however, the valuable wood-oil tree, one of the chief resources of the uplands, will grow on poor and rocky hillsides up to 2,500 ft., provided that the climate is warm and moist and that there is virtual immunity from frost. Population is sparse, especially on the higher western part of the platform, and Kwangsi, as a province, has one of the lowest densities in China Proper.

The coal and iron-ore deposits are small but the province, which has important resources of the rare minerals, antimony and wolfram, shares in the non-ferrous mineral wealth of the south-west.

Kwangsi occupies an interesting position in the linguistic and cultural pattern of South China. It was colonized late in the history of the country, by two distinct groups of Chinese, one of Cantonese speakers from the east and the other of Mandarin speakers from the north, migrating southwards across the Nanling passes into the valleys of the northern and north-western tributaries of the Si kiang. The linguistic distinction is still marked, Cantonese being the speech of the Wuchow district and the south-east and Mandarin, in its south-western dialectical form, of Kweilin and the northern borders; there is an interesting bilingual area round the city of Liuchow in the middle of Liu kiang valley where the two streams have blended. In the hilly or mountainous belts between these two Chinese groups a considerable number of aboriginal tribes survive, the Yao giving their name to the Yao shan (see p. 126).

Kwangsi was long considered one of the most lawless and backward provinces of China, but in recent decades the situation has materially changed. It has been the scene of active road construction, with Nanning as the chief centre, and some of the cities, particularly Wuchow, have been rebuilt and modernized. The Kwangsi troops have contributed some of the best fighting elements to the Chinese army. Furthermore, with the transfer of some of the factories from the Japanese-occupied coastal area, there are the beginnings of industrial development in the province.

#### (O) THE SOUTH-WESTERN TABLELAND (YUNKWEI PLATEAU)

##### *General Features*

The name 'Yunkwei Plateau' given to this region by Chinese geographers is derived from the first syllables of the two late-formed provinces of Yunnan and Kweichow which principally compose it. As a structural region, however, it extends beyond their limits into



Plate 74 Ricefields and forest, Kwangsi

The gentler slopes have numerous flooded rice paddies, while the steeper slopes remain thickly forested. Such land utilization checks the ravages of soil erosion.



Plate 75. Limestone pinnacles near the Kwei kiang, Kwangsi

These limestones are eroded into fantastic shapes; bare cliffs occur amongst densely forested slopes. The narrow alluvial lowland is settled and cultivated.





Plate 76. Limestone landscape near Kweilin, Kwangsi.  
Another view of the Kwangsi limestone country with flooded ricefields



Plate 77. Kweilin, Kwangsi  
Kweilin, on the Kwei kiang, is situated in the hill country of north Kwangsi.

northern Indo-China and into parts of the adjacent provinces on the Chinese side. On a narrow interpretation of its extent it is at least twice the size of Great Britain.

The lofty tableland of south-west China is at once one of the largest and most distinctive and much the most isolated of the natural divisions of the country. Its uniformly high elevation and intricate relief and its remoteness from the ancient centres of Chinese civilization in the Hwang ho and Yangtze basins have combined to keep it until recently a wild and inaccessible borderland. Although interest in the trade routes to India, which pass through it, led to early Chinese attempts to control the south-west and even to the settlement of some soldier-colonists, it is only within the last three centuries that it has been at all effectively under Chinese authority and fully incorporated in the provincial system; even today probably one half of its inhabitants are aboriginal tribesmen. The circumstances of the Japanese invasion, however, have so greatly enhanced its significance for China that it is now being rapidly integrated into the national life.

*Structure and Relief.*—The physical history of south-west China has been very different from that of the south-east. The latter, as has been pointed out, is a very ancient land-mass, part of, or at any rate very closely related to, the old continent of Cathaysia. South-west China, on the other hand, remained a wide and deep basin of deposition between Cathaysia and other ancient blocks in Tibet and Indo-China until far into the Mesozoic era. In it was laid down a long series of Palæozoic and Mesozoic sediments, with limestones greatly predominating, and these are the chief formations of the region which finally became a continental area in Jurassic times. The rocks were then subjected to the pressure of the Yenshanian movement, which here, as elsewhere in China, tended to produce dominantly north-east to south-west folds (see p. 474). South-west China, however, lay so close to the main centres of disturbance in the later (mid-Tertiary) Himalayan uplift as to be inevitably affected by it. The precise effects of this movement on the present features of the region have not yet been satisfactorily interpreted: almost certainly the great north-south ranges, now usually called the Alps of Sino-Tibet, which traverse western Yunnan from the Tibetan border of the Red Basin of Szechwan and continue into Indo-China, originated at that stage. The direction of the folds was undoubtedly influenced by the position of the old stable blocks in Tibet and Indo-China (Fig. 39).

The high relief of south west China, however, is not the direct result of the Himalayan movement, which was succeeded by a long period of denudation and peneplanation and by extensive faulting, probably in Pliocene times. The remarkable series of old lake-basins filled with late Tertiary fresh-water beds, which today form the most fertile part of Yunnan, may be in part the result of these fractures. There is general agreement that the great elevation of the south-west is due to a recent (Quaternary) uplift, in all probability still in progress. It is also as a result of this uplift, which has not been accompanied by fresh folding, that the region can, in broad terms, be described as a tableland or plateau. In detail it is exceedingly complex. The uplift has naturally rejuvenated the rivers, which in Yunnan have excavated, in this new cycle of erosion, deep canyons 3,000 to 4,000 ft. below the general level. In addition to this dissection, considerable mountain ranges occur even in the eastern part of the region which most corresponds to the ordinary conception of a plateau. They become more numerous in western Yunnan, which is so mountainous that it is probably best to consider it as a part of the border region of the Alps of Sino-Tibet, mainly dominated by great north-south ranges (see p. 83).

Three pronounced terraces or steps can be clearly distinguished as the tableland rises from lower levels in the east to higher levels in the west; this rise is accompanied by a progressive decrease in the age of the strata from east to west. The first terrace with an elevation of about 1,000 ft. occupies the western parts of Hunan and Kwangsi, although the occurrence of the west-east thrust belt of the Nanling on the borders of the two provinces masks its continuity. This terrace, being at a relatively low elevation, is not usually included in the Yunkwei Plateau; as a transitional zone it has already been referred to elsewhere (see p. 126).

On the borders of Hunan and Kweichow there is a pronounced rise to the 4,000 ft. level, leading to the second great terrace, the Kweichow plateau. Farther to the west, along a line which keeps fairly close to the Yunnan-Kweichow boundary on the north and then curves south-west, is another marked step to the 6,000 ft. level. This lofty terrace, which merges westward into the Alps of Sino-Tibet, is the Yunnan plateau (Plates 79, 85, 86).

These two latter terraces form the major divisions of the South-Western Tableland. While they have certain features in common, they come under different hydrographic regimes and have different orientations. The South-Western Tableland is not an integrated

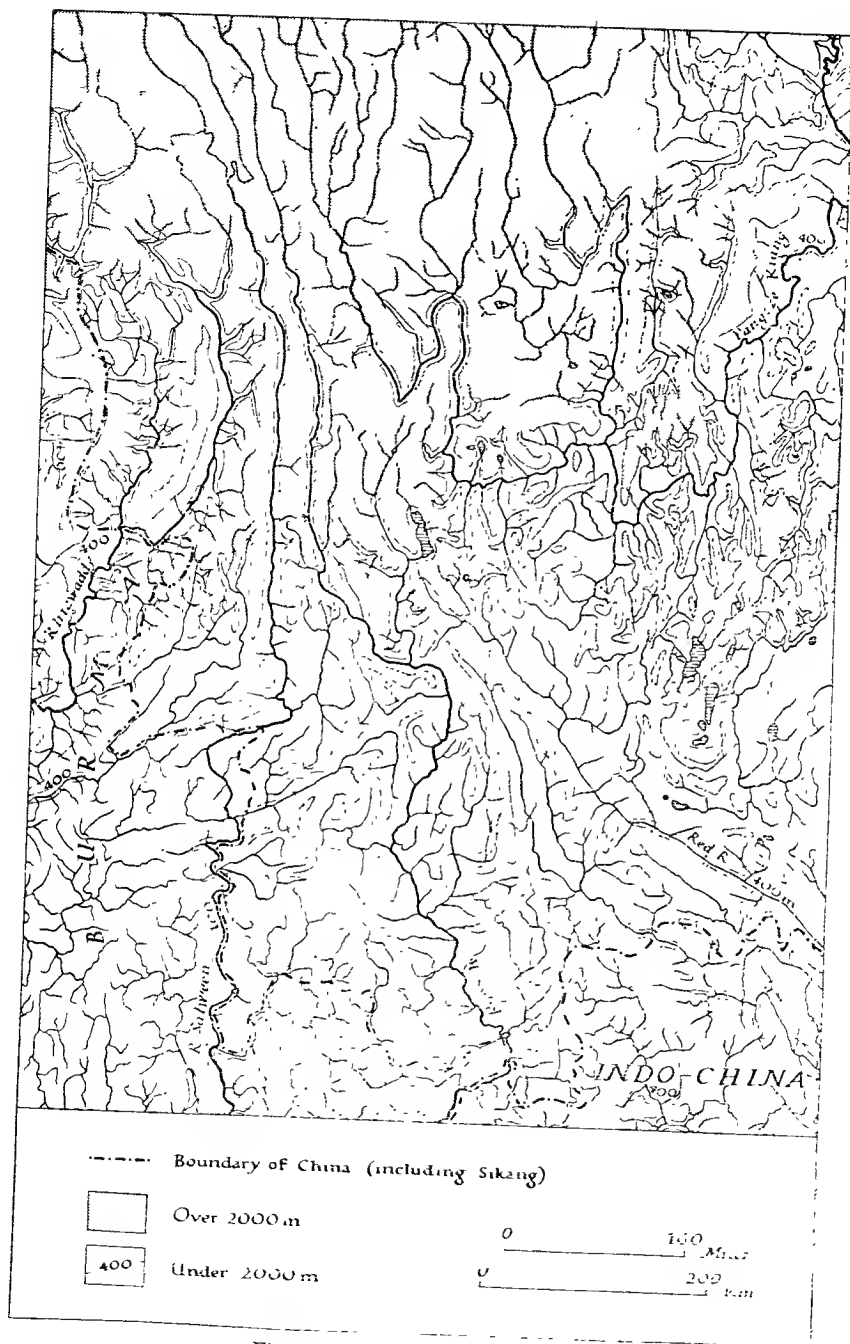


Fig. 39. South-western China

Based on *Bathymorphological Map of China* (Shanghai and Chungking, 1939).

natural region such as the Red Basin, with its well-defined mountain ramparts and converging rivers. It has no central focus and its unity as a region consists entirely in the dominance of certain physical characteristics.

(1) *The Kweichow Plateau*

For convenience the whole of this terrace may be called the Kweichow plateau, but, in addition to nearly all of the actual province of Kweichow, it includes : (1) the south-eastern and lower part of Yunnan ; (2) a broad belt of plateau to the north-east of Kweichow, which forms the high south-eastern edge of the Red Basin on the one side, and rises steeply from the Tungting lake-basin on the other. It is this north-eastward extension of the Yunkwei Plateau which converges on the extreme eastern end of the Tapa shan to form the region of the Yangtze gorges. They occur in the region of contact between the east-west thrust zone and the north-east to south-west Cathaysian alignment. The Kweichow plateau is essentially a watershed. In the centre there still remains a large area of almost undissected tableland, the divide between the tributaries of the Yangtze to the north and of the Si kiang to the south. Of the former the Wu kiang, following a sinuous course to the Yangtze in the Red Basin and the Yuan kiang, flowing north-eastwards to the Tungting hu, are much the most important, as is the Liu kiang of the latter.

*Settlement and Resources.*—The Chinese first reached the plateau from the Yangtze, and modern Kweichow typifies the normal relationship of Chinese and aborigines south of the great river. With their characteristic 'bottom lands' agricultural technique, the Chinese rice cultivators are completely dominant in the peripheral valleys, and here Mandarin is almost exclusively spoken. On the plateau the aborigines, of whom the Miao (see p. 429) are the most numerous, are still in the majority in most rural areas ; they practise a more primitive form of agriculture, growing subsistence crops which include wheat, maize and beans, adapted to the cooler and drier conditions of the higher levels where there is little water for irrigation. The Chinese, however, are dominant in the trading centres and market towns of the plateau. The chief city, Kweiyang, stands in the heart of the tableland at an elevation of 3,400 ft., a most unusual position for a Chinese provincial capital. The explanation is that it developed as the administrative centre when the province of Kweichow was first carved out of what had previously been 'the Miao Territories'.



Plate 78. Wuchow, Kwangsi

Wuchow is an important river port and trading centre at the junction of the Kwei kiang and the Si kiang

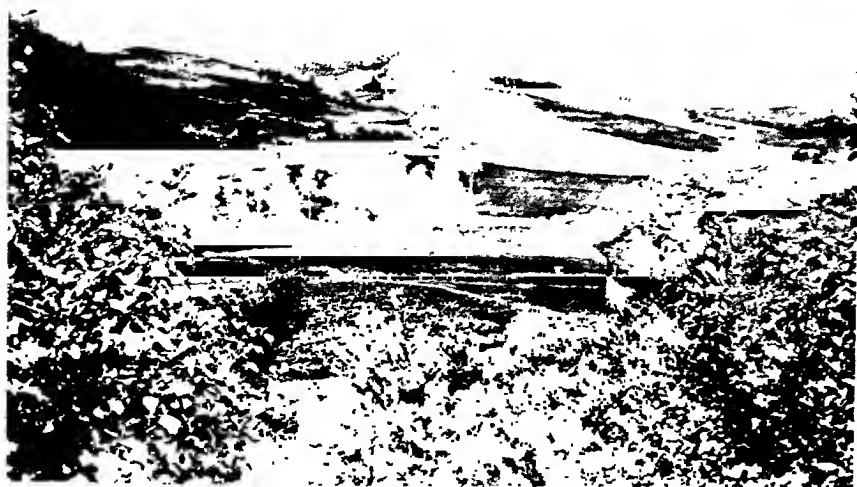


Plate 79. Landscape in Kweichow

The rolling surface of the Kweichow plateau includes areas of cultivation and grassland among remnants of the forest cover.



Plate 80. Wooded gorge in Kweichow

The Kweichow plateau has numerous wooded gorges of which this is a characteristic example. The difficult track and human portage are also typical.

Kweiyang is now becoming a very important focus in the new networks of roads and railways designed to link Yunnan, the Red Basin, the Central Yangtze Basin and the Si kiang valley. It occupies a central position in relation to these four crucial regions and is the point where the Burma Road forks to Chungking and Hankow respectively. The rapid development of communications in Kweichow and the enrolment of the aborigines in the Chinese armies and labour corps are hastening the process of assimilation.

The natural wealth of the Kweichow plateau lies mainly in its forests and minerals. The plateau itself is for the most part dry and bare and a good deal of it is of the karst limestone type reminiscent of northern Kwangsi. The peripheral valleys, however, have rich and valuable woodlands. Those of the Liu kiang and other tributaries of the Si kiang are of a sub-tropical type and include camphor, varnish and wood-oil trees (see p. 267); in Kweichow, unlike Kwangsi, the last-named tree is very little grown on the uplands. The forests of the northern valleys, particularly of the Yuan, are still among the most important in China Proper, in spite of considerable depletion. They chiefly consist of conifers, with some oaks and chestnuts; logs, bound together in the form of huge rafts, are floated to the Tungting hu down the Yuan. Much of this timber now comes from plantations (Plates 79, 80).

The distribution and location of non-ferrous metals in Kweichow, Yunnan and parts of the adjacent provinces in southern China is of great scientific interest. Dr W. H. Wong, formerly Director of the Chinese Geological Survey, has said that 'South China constitutes probably the most typical example in the world of the distribution of metals in successive aureoles around the principal magma according to the greater or less facility for precipitation.'\* The magma in this case is intrusive granite, associated probably with a period of great igneous activity during the movements of Mesozoic times. Two zones of granite magma have been distinguished in south and south-west China, and, corresponding to these, are two concentric series of non-ferrous metals, ranging from a zone of tin, wolfram and molybdenum nearest to the magma through one of zinc, lead and copper and then of antimony to a mercury zone at the greatest removal from the magma. The chief copper-lead-zinc extends from Hunan into Yunnan, with copper most important in Yunnan and lead and zinc in Hunan. One of the two tin-wolfram

\* Wong, W. H., 'Les Provinces Métallogéniques de Chine', *Bulletin of the Geological Survey of China*, No. 2, p. 38 (Peiping, 1920).



zones also extends from Hunan into Yunnan and the other from Kwangtung through Kwangsi into northern Indo-China. The chief tungsten zone is in the Nanling Belt and lies mainly on the borders of Kiangsi, Hunan and Kwangtung. In the case of Kweichow it is mercury, mined on the plateau to the north of Kweiyang, which is of chief importance. Much of the Kweichow plateau is underlaid by coal-measures of Jurassic age but the seams are too thin for large-scale mining.

## (2) *The Yunnan Plateau*

*Structure and Relief.*—Practically the whole of Yunnan is over 6,000 ft., with the exception of the relatively small south-eastern portion which continues the 4,000 ft. Kweichow level and of the deep canyons of its great southward-flowing rivers as they approach the borders of Indo-China. Not more than 10% of its surface consists of level plains or cultivable basins and a high proportion is occupied by mountain chains.

These mountain chains are very complex and belong to more than one system. Until there has been a much fuller investigation in the field any interpretation of their directions and relationship must be very incomplete. The whole of western Yunnan is very mountainous and is characterized by lofty north-south or NNW-SSE chains with deep intervening valley troughs. The broken ranges of the Yunnan arc, a remarkable looping of chains, concave to the south, characterizes much of northern Yunnan, a region of very complicated relief. The north-east approximates to the type of the Kweichow plateau with a prevailing north-east to south-west alignment of hill ranges and plateau strips. The south-central part of the province which lies to the south of the section of the Burma Road linking Kunming (Yunnanfu) with the fertile lake-basins around Tali has a higher proportion of open plateaux than the north, but is deeply incised by the Red river and its tributaries; these have remarkably straight courses to the south-east, and are bordered by mountain chains with the same alignment, such as that of the Ailao shan. Finally the south-east (to the east of Kunming and the Indo-China Railway) is a lower plateau and has the greatest proportion of plains and open valleys (Plates 85, 86, 88).

Within this setting the river drainage, which itself is one of the chief factors in the complexity of the surface conditions, can be briefly described (Fig. 39). Western Yunnan is traversed by great rivers which enter it from the still higher Tibetan plateau. In their

upper (Tibetan) courses they flow at considerable distances from each other, but as they descend they bend south-east and assume for a time completely parallel courses, flowing for a long distance south-south-east in very deep contiguous troughs. The Mekong, in the centre, is about thirty miles from the Kinsha kiang to the east and about twenty miles from the Salween to the west. The Salween flows through only the western extremity of Yunnan. The Mekong, deviating slightly more to the south-east, traverses the whole length of the province before entering Indo-China. The Kinsha kiang makes its abrupt elbow-bends (see p. 36) and turns northwards towards the Red Basin in the extreme north of Yunnan where it borders southern Szechwan. In alignment with the direction of the Yangtze above the first of the two elbow-bends is the Sung koi or Hung ho (best known to Europeans as the Red river of Tongking), which rises in the heart of the Yunnan plateau and then follows a straight south-eastward course to the Tongking border and its delta below Hanoi. The diversion of the Kinsha kiang to the north-east is probably the result of the great Quaternary uplift of this region, and its former continuity with the present Red river is generally inferred. All these rivers are very deeply incised in the plateau and their canyon-like valley troughs are for the most part malaria-stricken jungles. They present tremendous obstacles to east-west communications within Yunnan itself and to all land contacts between China and Burma or India. The Burma Road, between the Tali district and the frontier, has twice to descend and then again to rise some 4,000 ft. in order to cross the troughs of the Mekong and the Salween (Plates 83, 87).

*Settlement and Resources.*—The most valuable parts of Yunnan agriculturally are old lake-basins. These are now usually dry or nearly dry, but a few lakes of considerable size remain, including Tien hu, south of Kunming, and Erh hai, near Tali. The latter lies near the foot of the snow-capped Ts'ang shan, but is separated from it by a long narrow strip of intensively cultivated riceland, the Tali plain, thirty miles long and two or three miles wide. There are two principal groups of these lake-basins, with rich soils derived from late Tertiary fresh-water deposits; they contain most of the important market towns of the province. The first lies in the east with its main cluster around Kunming and thence extending southwards and south-eastwards towards the Tongking frontier. The second is on the extreme western border of the plateau with the Alps of Sino-Tibet to the west. The principal basins are around Tali and include

those of Mitu and Paoshan, but a chain extends northwards by Erhyüan and Kienchwan to the plain of Likiang, the most northerly centre of any importance in Yunnan and on the threshold of Tibet.

It is noteworthy that in south-western Yunnan there is a striking exception to the general rule that the Chinese are essentially the people of the basins and plains and the aborigines the people of the hill districts. In south, and particularly south-west Yunnan, the Chinese keep to the healthier plateaux and only some of the older stocks, particularly the Shans, seem to have acquired a certain immunity from the tropical diseases which are rampant in the valleys (Plates 81, 82).

The lake plains are the most intensively cultivated and densely peopled parts of Yunnan, with rice as the summer crop and wheat and beans as the winter crops. They by no means exhaust the agriculture possibilities of the province. Yunnan has such a large and varied terrain that different types of farming are appropriate to the various localities. Chinese interest in its agricultural future is now stimulated not only by its possibilities but by the importance of finding substitute crops for the opium poppy. In the past this has been the chief commercial crop, partly because of the large demand and partly because the product is easy to transport, a very important consideration in a country of such difficult relief. The prohibition laws against the cultivation and use of opium have been enforced with increasing rigour during the war years but they have led to much rural unrest and emigration of population. The possibilities which are now being explored include the growing of wheat, for which some of the northern valleys with a relatively temperate climate are well suited, of hemp and flax on the highlands, of mulberry plantations for the silk industry on the rugged lands of the south-west too steep for tillage, and of tea plantations, which are said to be very promising, in some of the districts to be traversed by the new railway to Burma. South-west Yunnan has also potentialities for the cultivation of certain types of rubber plants, although not for the equatorial *Hevea brasiliensis*, grown in Malaya.

There remain, however, vast areas of grasslands on the high plateaux and mountain slopes which can be utilized only for pastoral farming, and in the development of live stock rearing lies one of the chief hopes for the future of the province. South-west China has already much the largest number of farm animals per unit of crop



Plate 81. The Erh hai at Siakwan, Yunnan

Around the Erh hai at a height of nearly 7,000 ft. are extensive cultivated lowlands; the mountains nearby rise to over 9,000 ft. Siakwan is a trading centre of some importance.

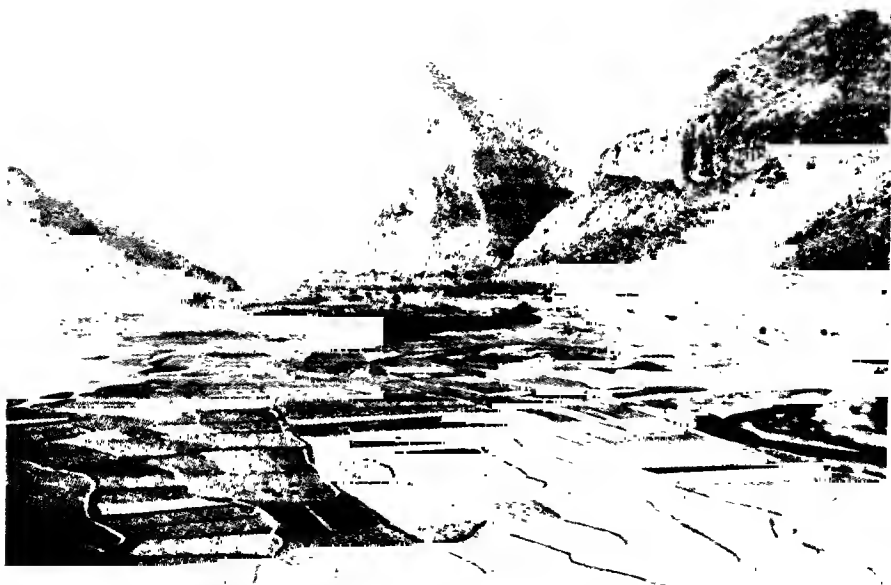


Plate 82. The Shihku plain, northern Yunnan

This cultivated area is an old lake plain 200-300 ft. above the level of the Yangtze. Shihku is the most northerly settlement of the Min Chia.

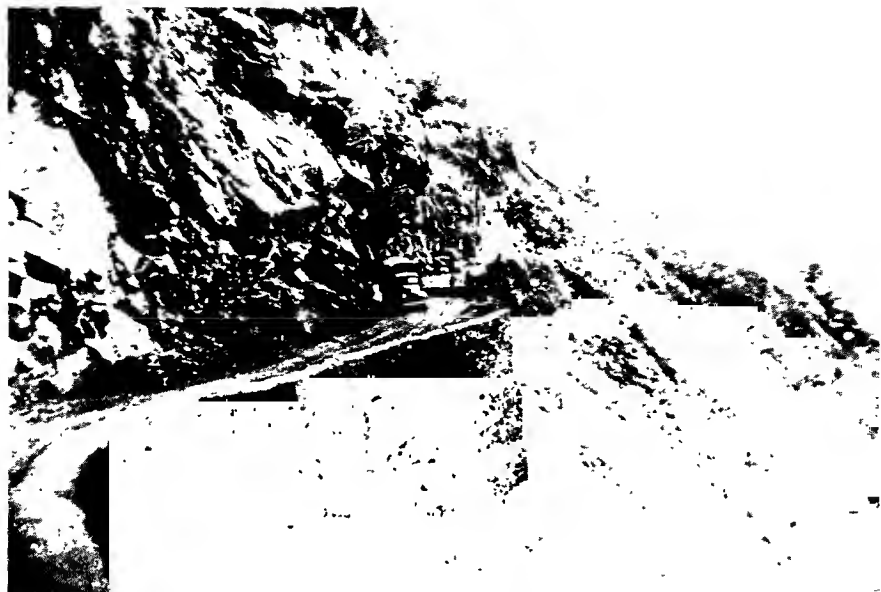


Plate 83. The Burma Road, Yunnan

The road climbs out of the Mekong gorge to Paoshan, crossing one of the many lofty ridges of western Yunnan.



Plate 84. Kunming, Yunnan

The photograph shows the centre of the city with the Governor's residence in the background.

production in the country, but the aggregate is small in relation to the possibilities. Large areas of natural grassland are almost unutilized. This is accounted for only in part by isolation. The concentration of Chinese agricultural technique on arable crops and the absence of a demand for dairy products are important factors.

Apart from agricultural and pastoral possibilities, Yunnan has many magnificent forests and, as indicated in an earlier section (see p. 133), valuable minerals, which include lead and particularly copper in the north-east. Coal is fairly widespread but the seams are thin and the cost of transport high. The most important fields are at Ipinglong in the mountainous region of the north which supplies the industries round Kunming and will be essential to the new Burma railway.

The realization of the great latent wealth of Yunnan depends mainly on the development of communications. Here nature has imposed tremendous obstacles but the Chinese in their present temper seem grimly determined to surmount them. Much has already been accomplished. Whatever may be the post war commercial value of the Burma Road as a means of foreign trade and access to the sea, it has at least connected many of the chief centres of the economic life of the province and linked them via Kunming and Kweiyang with the Yangtze valley. The linking of Kunming and its rich lake-basins with those round Tali seems to have been a principal consideration in determining the actual route, which, from Kunming to the Burmese frontier, is extremely circuitous. The Yunnan-Burma railway, which is to use a more direct route from Kunming, following a part of the valley of the Red river and then some of the tributary valleys of the Mekong and the Salween, will probably be of even greater importance, and will open up the more tropical south; there, however, the greatest handicap is the prevalence of malaria and other diseases (Plate 83).

Kunming, in the centre of the largest group of lake-basins on the relatively healthy eastern plateau, will certainly develop as the chief metropolis of south-west China. It will be the junction of the railway routes from Burma and Tongking, the means of access to the seaboard, and the chief collecting and distributing centre for Yunnanese trade with the rest of China. It will also be important as a cultural focus for the gradual diffusion of Chinese civilization over the wide areas of Yunnan which are as yet only on its fringes (Plate 84).

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1. For South China the works on China as a whole cited at the end of Chapter II should be consulted in addition to :—Davies, H. R., *Yunnan : The Link Between India and the Yangtze* (Cambridge, 1909)—a pioneer work but still useful ; Franck, H. A., *Roving Through Southern China* (New York, 1925)—a descriptive work, with useful information ; Gregory, J. W. and C. J., *To the Alps of Chinese Tibet* (London, 1923).

2. The following papers and articles are also of interest and value :—Andrews, R. C., 'Travelling in China's Southland', *Geographical Review*, vol. vi, pp. 133-146 (New York, 1918) ; Fuson, C. G., 'The Geography of Kwangtung', *Lingnan Science Journal*, vol. vi, pp. 241-256 (Canton, 1928) ; Cordier, G., 'Le Yunnan', *Revue indochinoise*, pp. 403-437, vol. ii (Hanoi, 1915) ; pp. 99-135, 371-399, vol. i, pp. 61-102, vol. ii (Hanoi, 1916) ; Wilton, E. C., 'Yunnan and the West River of China', *Geographical Journal*, vol. xlix, pp. 418-440 (London, 1917) ; Cressey, G. B., 'The Landforms of Chekiang', *Annals of the Association of American Geographers*, vol. xxviii, pp. 259-276 (Albany, N.Y., 1938) ; Fitzgerald, C. P., 'The Tali District of Western Yunnan', *Geographical Journal*, vol. xcix, pp. 50-61 (London, 1942) ; Fitzgerald, C. P., 'The Northern Marches of Yunnan', *Geographical Journal*, vol. cii, pp. 49-56 (London, 1943) ; Gregory, J. W. and C. J., 'The Alps of Chinese Tibet and Their Geographical Relations', *Geographical Journal*, vol. lxi, pp. 153-179 (London, 1923) ; Ward, F. Kingdon, 'From the Yangtze to the Irrawaddy', *Geographical Journal*, vol. lxii, pp. 6-20 (London, 1923).

## Chapter VI

### COASTS

General Features : The Gulf of Tongking and Hainan Strait : Hainan Island : Kwangchow wan to the Canton Delta : The Coasts of the Canton Delta : Hong Kong and its Approaches : Hong Kong to Swatow : Swatow to Amoy : Amoy to Foochow : Foochow to Wenchow : Wenchow to Nimrod Sound : The Chusan Archipelago : Hangchow wan : The Yangtze kiang : Eastern Kiangsu : The Coasts of Shantung : The Gulf of Pohai : The Gulf of Liaotung : Bibliographical Note.

#### GENERAL FEATURES

The coasts of China are varied in form and reflect the physical features of the interior. Communications are varied also : some coastal areas have few roads, no railways and are virtually isolated from the rest of China ; others have roads, railways and waterways in comparative abundance. The maritime trade of the country has focused upon certain great centres, notably Hong Kong and Shanghai, which are to a large extent the product of the modern commercial exploitation of China by Western powers. The paucity of roads and the sparse railway network has made inland waterways indispensable in the system of communications. Rivers and canals carry a variety of craft, including junks, sampans and other boats. Fishing villages are numerous on the coastline and outlying islands, and the people of the south-east coastal fringe have for centuries sailed from their intricate estuaries, bays, inlets and island-studded seas to trade with the outer world and experience those contacts with other peoples which have made them the most progressive element in Chinese life.

Some of the climatic hazards which affect navigation in the China seas are discussed on p. 217. The formation of ice in the Gulf of Pohai and the rivers of North China takes place in most years, and ice is not unknown on the Yangtze kiang. The seasonal winds, the north-east monsoon in winter and the south-west monsoon in summer, sometimes constitute a danger to shipping, and the occasional, but destructive, typhoons are even more to be feared. Various anchorages along the coast give protection from one or other of these dangers.

The type of coastline has been indicated on the maps as far as possible, but little information is available for those sections of the coast which are repellent in aspect for the navigator. As China has entered relatively recently into maritime commerce on a considerable scale, and as its railway network is only a skeleton, its future



development will almost certainly be in the direction of centralization upon a few great ports. But the smaller centres will still have their place and may even grow in significance with economic expansion. In a country of such vast distances, it is impossible to foresee the effect of air services upon maritime commerce, but the need for port facilities will presumably remain.

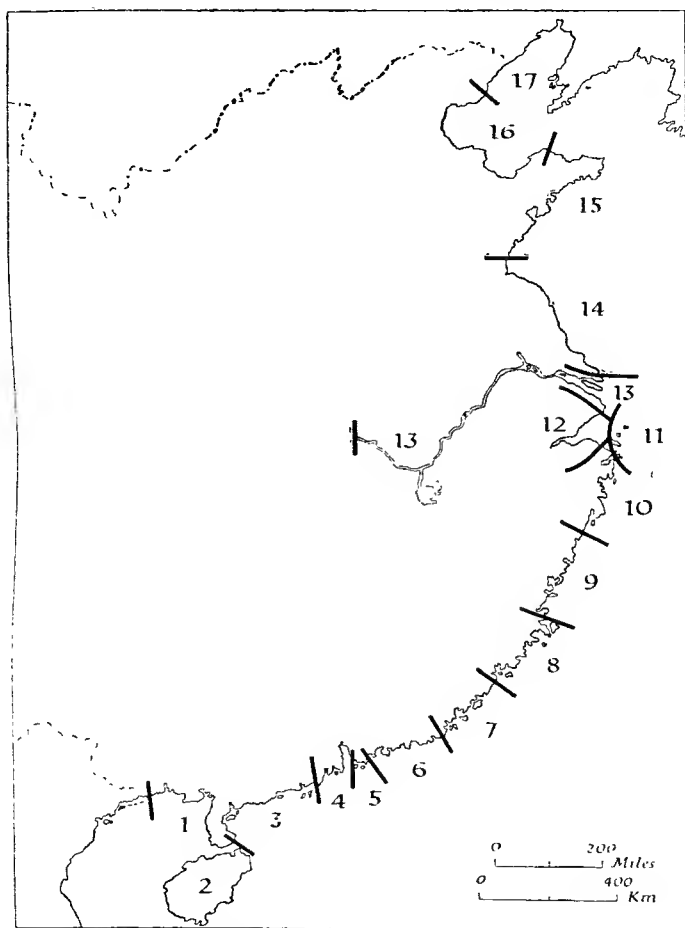


Fig. 40. Key to coastal descriptions

The coasts may be divided into seventeen main sections, under which they are discussed in this chapter (Fig. 40). There are seven major physical divisions which are recognizable and they are given here as a guide to the general coastal types which may be seen.

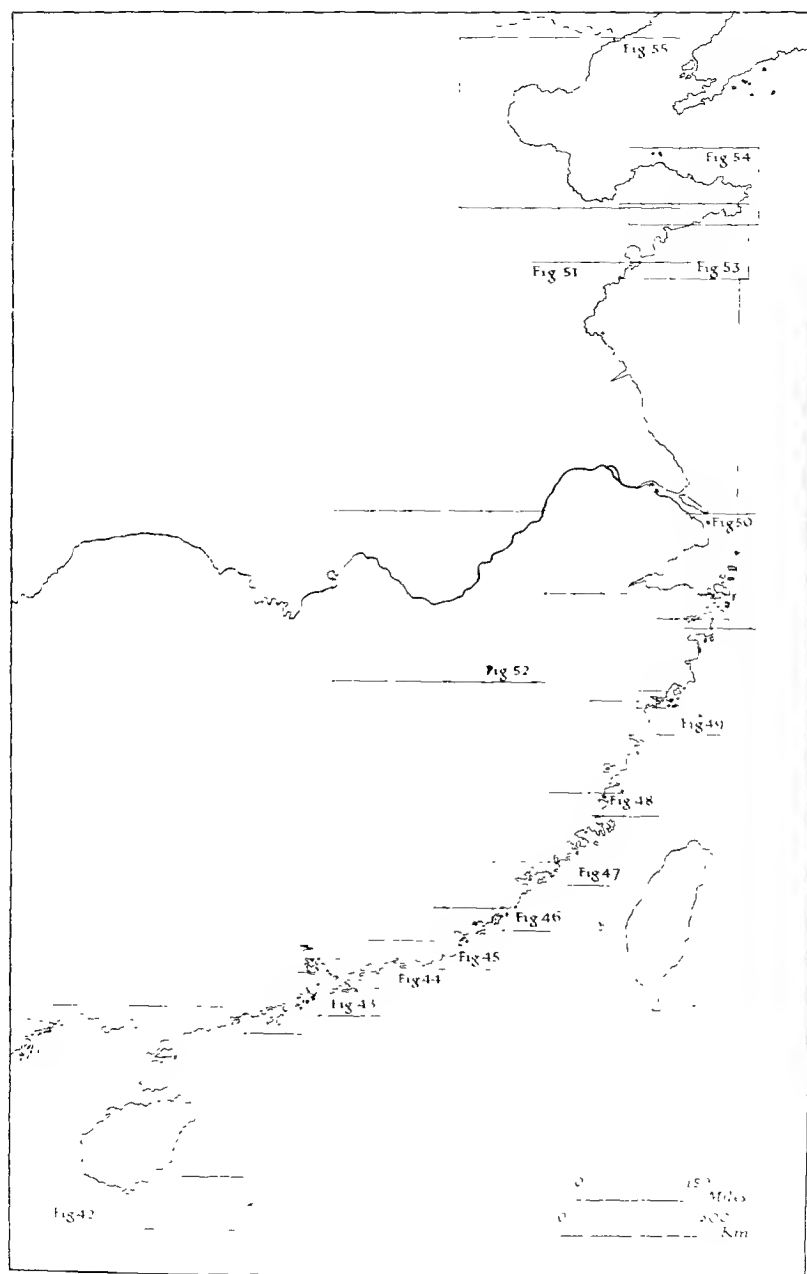


Fig 41. Key to the series of coastal maps

The coast maps have been based mainly on (i) British Admiralty Charts and (ii) the relevant plates of the *New Atlas of China* (Shanghai, 1934). Further information for various areas has been taken from the 1 : 80,000 G.S.G.S. Series 3961, Hongkong and the New Territories (1938); from Chinese Admiralty Charts; and from Chinese Maritime Customs Charts.

The approximate scale of Fig 43 is 1 : 1,150,000; of Figs. 45-50, 53-4 is 1 : 1,450,000; of Figs. 42, 51-2, 55 is 1 : 3,950,000



Fig. 42. Indo-China frontier to Macao, with general key to Figs. 42-55  
 M- Macao K- Kam Wan H- Hainan Wan

*A. The coast from the Indo-China frontier to the Canton delta*

This coast (Sections 1-3) is unsurveyed for the most part, but it consists mainly of mudbanks and sands with some sandhills and low cliffs. The large Hainan island lies off the Luichow peninsula. There are very few ports and anchorages are of particular significance.

*B. The Canton delta*

The delta (Section 4) is made up of the channels of the Si kiang, Pei kiang and Tung kiang and various minor rivers, and the coastline consists primarily of embanked ricelands with stretches of sand and mud. Some hills in the delta reach the coast, and Macao (Portuguese) lies in a bay surrounded by hills.

*C. The coast of South-east China, from the Canton delta to Hangchow wan*

This covers Sections 5-12 of the coasts and has a general trend from south-west to north-east, parallel with the major relief features. Land and water are completely intermingled, with broad open tidal rivers, bays and peninsulas, sand dunes and tidal flats, and very numerous islands. The navigational possibilities are varied, but there are numerous anchorages, several river ports and one great port, Hong Kong, with a magnificent harbour between the mainland and island.

*D. The Yangtze kiang*

The Yangtze kiang (Section 13) includes four important subsections. The delta extends from Hangchow wan to the estuary of the Yangtze and its shores are embanked with outlying sandbanks and mud. The one great port is Shanghai, on the Whangpoo river, and there are useful anchorages off the outlying islands which guard the approaches to the Yangtze. The river is used for ocean-going ships as far inland as Hankow, and is discussed under three headings.

*E. The coasts of Eastern Kiangsu*

The coasts (Section 14) are low, flat and almost unknown to all navigators, except the local boatmen with their junks and other small craft. Very extensive sandbanks lie off the coast, which consists of salt marshes and mudflats. The port of Laoyao, at the terminus of the Lunghai railway, serves part of this region.

*F. The coasts of Shantung*

Stretches of sandy coast with lagoons and mudflats alternate with inhospitable cliffs, punctuated by a few bays, in three of which are situated the major ports of Tsingtao, Weihaiwei and Chefoo. There are a few useful anchorages, but much of the coast is dangerous to shipping (Section 15).

*G. The coasts of the Gulf of Pohai*

Incompletely surveyed, these coasts (Section 16) resemble those of east Kiangsu and consist of salt marshes. Extensive mudbanks and sandbanks exist in coastal waters, and the one major port, Tientsin, is on the Hai ho thirty-five miles from the sea. The coastline along the Gulf of Liaotung to the frontier is discussed in Section 17.

**I. THE GULF OF TONGKING AND HAINAN STRAIT (Fig. 42)**

The coast between the frontier and Kwantau point consists of fairly low-lying country with shallow water offshore. A few short rivers flow into the sea, of which the most important is the Yuling ho. Kwantau point itself is a low peninsula with hills reaching 300 ft. sheltering Pakhoi anchorage. The treaty port of Pakhoi, a settlement of some 40,000 people, serves the town of Limchow, situated near the Yuling ho. The north-eastern side of the Gulf of Tongking, from Kwantau point to Nausa point, has numerous banks offshore; and fishing stakes, a frequent feature around the Chinese coasts, form a further peril to navigation. The island of Wai chow has a sheltered anchorage in a bay on the south-east side, with depths of 4 to 5 fm.

Hainan strait is ten miles wide in its narrowest part, with water 40 fm. deep in the middle. The mainland coast consists of a number of bays, in the outer parts of which there are anchorages. Tong chong has reefs on the shore, and in Kami wan there are low cliffs with reefs and a gently shelving shore. Hainan wan has similar cliffs, but with a sandy shore: further east the coastline consists primarily of sandhills with some shoals. The eastern side of the Luichow peninsula is, like the western, little known and almost unsurveyed. There are sand dunes along the coast, with scattered fishing villages. The Luichow river is navigable by small vessels, and the town of Luichow stands some distance inland from the north bank of the river.



Plate 85 Limestone region, Yunnan

This upland limestone country has deep valleys and rounded peaks ; the even line of the plateau is seen in the background. There is scattered forest amongst the scrub and pasture land ; a small cultivated area exists in the depression on the left where water is available.



Plate 86. Sandstone region near Amichow, Yunnan

The peneplaned surface is cut by deep valleys. The forest has been largely replaced by scrub.



Plate 88. Valley of the Heng kiang, Yunnan

The Heng kiang, which joins the Yangtze above Sui, flows in a narrow gorge cut in the Yunnan plateau. A maize field and a difficult trail are seen on the left bank of the river.

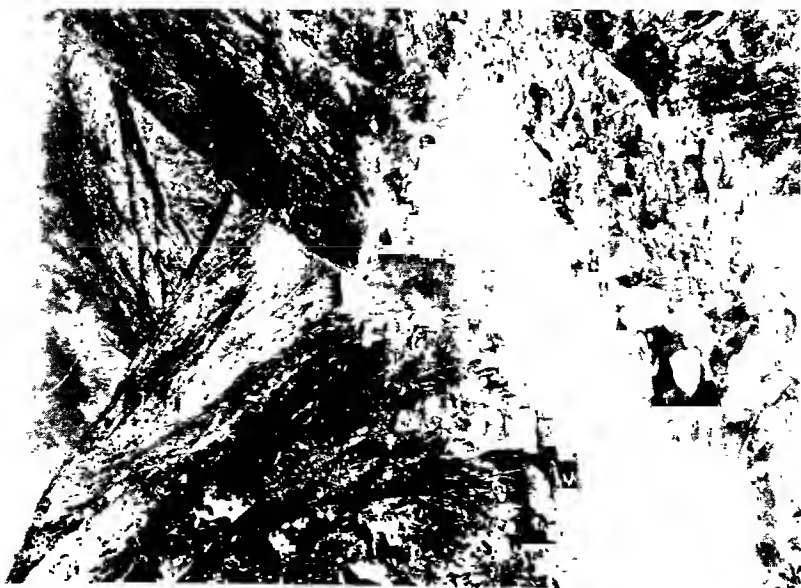


Plate 87. Gorge of the Mekong, western Yunnan

Numerous canyons, some of which are rocky and arid, occur in the mountainous region of western Yunnan.

*Communications.*—There are no motor roads and no railways in this area, which is one of the least-known parts of China. It is commercially undeveloped and transport is mainly by junks and small boats on rivers, or by trails leading through the forested countryside.

## 2. HAINAN ISLAND (Fig. 42)

Hainan island is part of the province of Kwangtung and consists of mountains reaching over 6,000 ft. in the south with lowlands broken by a few scattered hills in the north. The Chinese have colonized parts of the island, especially the coastal districts, and practise agriculture and fishing; they have sailing junks and boats capable of travelling oceanic waters. Only the north coast of the island has been surveyed; it consists mainly of sandhills with a varying extent of sandy shore and has a number of anchorages. The Hoihow kiang, a river accessible only to small boats, drains the north part of Hainan and serves Kiungchow, the capital of the island, a town of 46,000 people.

The east coast of Hainan consists almost entirely of low sandy coasts, and is generally avoided by shipping. The only significant anchorage is outside Tsinglan harbour. The south coast has a number of bays backed by high land, but is sharply exposed to the south-west monsoon. An anchorage between the two Tai chow islands is extensively used by ships travelling from Singapore to Hong Kong. The unnamed bay to the north-east of Lingsui point consists mainly of sandy beaches backed by high land. It has no safe anchorage during the south-west monsoon, but shelter against the north-east monsoon may be obtained in Namhoi chun, a bight between two headlands. Lingsui wan, a deep bay with a striking hilly setting, is also sharply exposed to the south-west monsoon, but provides anchorage against the north-east monsoon. Gaalong bay, which is smaller but similar in appearance to Lingsui wan, has no anchorage completely sheltered against the north-east monsoon, and heavy swell is caused by south and south-west winds in summer. There are various anchorages against the north-east monsoon in Yulinkan wan, and also in Sanya port, in the bay of the same name. The coast maintains its hilly character to the west, and there is an anchorage in Yai wan (Plate 89).

The west coast of the island consists largely of sandy beaches with various shoals offshore. Strong westerly winds blow at times against this coast and there are very few anchorages. Chappu bay



is used during the north-east monsoon and there are also anchorages off Hoitou, a fishing station of considerable local significance, in Hsingying Chiang for small ships at all seasons, and in Hiongpo bay.

*Communications.*—A railway runs southwards from Hoihow, but roads are poor. The Chinese settlement is firmly established over a comparatively small part of the island and the lack of modern communications reflects the undeveloped state of the economic life.

### 3. KWANGCHOW WAN TO THE CANTON DELTA (Fig. 42)

#### *Kwangchow*

The territory of Kwangchow, leased to France (see p. 124), consists of a narrow strip of land along the Matshé estuary, with various islands. The North-west channel of Nau chow provides a passage between this island and Tan hai. The main entrance to Kwangchow is about one mile wide between narrow drying banks that fringe sand dune coasts. The channel is everywhere at least one-and-a-half cables (900 ft.) wide and 4 fm. deep. The Bouquet anchorage is 7 fm. deep and is protected from the north-east monsoon.

Kwangchow wan is entered by a deep channel between various sandbanks and swamps. The port of Fort Bayard, a town of 12,000 people, is on the west side of the river, and ships anchor either in the river near the town or in the Hoiteou road; the latter anchorage gives shelter from typhoons. The port has, in fact, several miles of secure anchorage in depths of 6–20 fm.

Ché-kam (40,000 people), the commercial centre of the Kwangchow wan area, is dangerous to approach without local knowledge and ships anchor in the river. The coasts in the estuary consist almost entirely of mudbanks, with numerous fishing stakes, and there are various subsidiary channels useful for junk traffic connected with the main channel. Kwangchow wan has not been intensively developed; no docks have been constructed and it has been of very minor naval significance. There are anchorages off Nau chow in the approach to Kwangchow.

#### *Kwangchow wan to the Canton delta*

This coast is flat though backed by hills in places. Islands lying offshore provide some shelter, but many harbours in the bays along this coast are suitable only for local traffic. Tinpak



Fig. 43 The Canton Delta, Hong Kong and Bias Bay



harbour is small and the town, a salt port, can only be approached by small boats; anchorage is available outside the harbour in depths of 4-6 fm. The island of Taichuk chow provides shelter from the east for vessels with local knowledge in depths of 4-6 fm. Shoals and mudflats become increasingly frequent towards the mouth of the Si kiang. There are a few outlying anchorages with deep water, and the bays provide shelter for smaller ships. Huilingsan harbour is open to the south-west and is useful during the north-east monsoon for vessels of shallow or moderate draught. Deep bay consists largely of shoals and mudflats lie between the mainland and Haucheun with its neighbour, St. John island. Between these two islands there is a sheltered anchorage for small ships and in the channel, which runs between St. John island and the mudflats of the coast, vessels can find shelter in depths of 5-6 fm. Shito bay, to the south-west of St. John island, has a rocky shore with sandy beaches and good anchorages in the bay sheltered except from southerly winds.

*Communications.*—There are some good roads, on which motor bus services have been operated, in and around the Kwangchow wan territory. A road runs from Fort Bayard to Kongmoon, but its present condition is not known. The roads reach the coast in only a few places and there are no railways.

#### 4. THE COASTS OF THE CANTON DELTA (Fig. 43)

The Canton delta is the accumulation of the Si kiang, Pei kiang, Tung kiang and various minor rivers. It consists of a large number of islands, separated by channels and creeks, some of which are sufficiently wide and deep to admit large ships. Most of the channels are useful only for small craft, and in practically all there are various problems which can only be met by local knowledge. Junks with a draught of  $2\frac{1}{2}$  ft. move through the channels in trains behind steam launches. The greater part of the delta is below high-water mark and consists of ricefields preserved from inundation by embankments which are wide and marked by lines of fruit trees, with some houses and narrow footpaths.

*Approaches.*—Access to this maze of creeks and canals is difficult, but there are certain well-known channels and entrances between sandbanks and mudflats. From west to east there are three main entrances to the delta.

(1) The Tam kong, or South-west river, which is shallow and only of very local significance. There is an anchorage outside this channel on the west side of Kukok ngao kok.

(2) The Si kiang, or West river, entered by the Broadway, is useful only with local knowledge. The Si kiang, draining Kwangtung and Kwangsi, is navigable to Wuchow in June by ships drawing 13 ft. of water.

(3) The Chu kiang, or Canton river, which is by far the most significant. It is approached by three major channels between various islands. The Great West channel has depths of less than 4 fm. and extensive shoals; the only anchorages, which are shallow, lie to the east of the Nine islets and the south of Kiau island. The Lantao channel, easily the most important, is deep and clear of dangers and nearly two miles wide in its narrowest part. It is entered between Lantao, a mountainous island, and various smaller islands, and leads northwards to the Fansiak and Chuenpi channels. Beyond Lintin island navigational difficulties begin and Canton may be approached only with local knowledge. The third entrance to the Canton river is by the use of Hong Kong waterways round the east of Lantao to the anchorages in Castle Peak bay or Urmston road, and thence to the Fansiak channel.

The estuary and deltaic waters are difficult to navigate and Canton is in function rather a trading port with the interior than a centre for oceanic commerce. Access to the deltaic waterways is given by the Junk fleet and Lankit entrances, and the main channel to Canton begins at the Chuenpi channel, which has an anchorage 6 fm. deep (see inset, Fig. 43).

The Second Bar, twenty miles below Canton, can be crossed by ships drawing 22 ft. at high water spring tide. Ships of this draught can also reach Whampoa, twelve miles farther up the river, the site of the projected deep water port. In winter the depth at the second bar is 13 ft. at low water spring tide and 19 ft. at high water. Only very small Chinese ships use the Whampoa channel to Canton, but the Blenheim passage has a least depth of 9 ft. The largest ships that ever reach Canton have a draught of  $16\frac{1}{2}$  ft. at spring tides and  $14\frac{1}{2}$  ft. at neap tides; larger vessels anchor at Hamilton creek, six miles below Canton, which can receive vessels drawing 21 ft.

### *Macao* (Fig. 43)

Macao, a Portuguese possession since the sixteenth century, lies to the west of the Great West channel. In spite of the monopoly

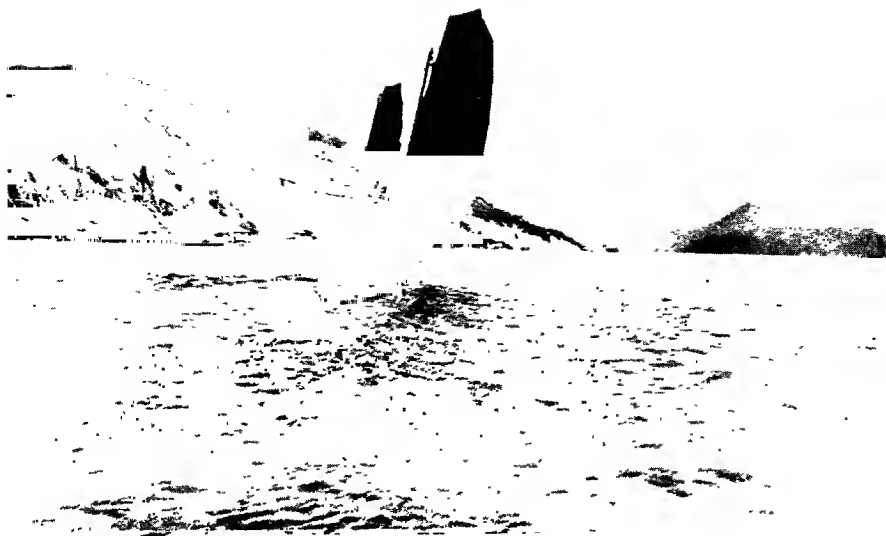


Plate 89. Gaalong bay, Hainan

The hilly coast is characteristic of southern Hainan. The bay is very exposed.



Plate 90 Baia da Praia Grande, Macao



Plate 91. Hong Kong

The hills of the mainland (New Territories) are seen in the background, with Kowloon on the extreme left



Plate 92. Tsing Yi wan (Repulse bay), Hong Kong

This indented and hilly coast is typical of many parts of the south coast of China.

of European trade held by this town for several centuries, it is comparatively small, with only 157,000 people and of second-rate quality as a port. The harbour is enclosed by moles on the east, south and west and in it a small area is dredged to a least depth of 13 ft. A channel with a least depth of 9 ft. is maintained to Macao, but it cannot be entered without local knowledge and pilotage (Plate 90).

*Communications.*—Railways run from Canton to Hankow, Kowloon (Hong Kong) and Samshui. The line east of Sheklung has been destroyed in the course of military operations and considerable sections of the line to Hankow are also dismantled. Motor roads occur only in Macao, north of Macao as far as Shekpei, and sparsely around Canton. The road from Canton to Hong Kong is very bad in parts, and patches of the road to Shiuchow are equally poor.

## 5. HONG KONG AND ITS APPROACHES (Fig. 43)

Groups of hilly islands offer dangers to the Hong Kong shipping routes between the western end of the Ladrone islands and Mirs bay forty-seven miles away. Most of the islands have cliffed coasts with very few landing places, and are sparsely inhabited by fishing communities. The main channels to Hong Kong have been shown in Fig. 43. From the south-west, vessels pass between the Ladrone and Aichau islands, and in a north-easterly direction to the West Lamma channel. In the Ladrone there are anchorages for small vessels during the north-east monsoon off the entrance to Pumice Stone bay, and off the bight in the south-west side of Wong mu. Ships coming from the south may pass to the east of the Lema islands or between the Lema and Kaipong islands through the three-mile-wide Taitama channel. There is anchorage on the north of Tamkan island, in 8 fm., giving shelter during the north-east monsoon (Plate 91).

Having passed the outer girdle of islands, ships proceed by various good channels through the Hong Kong archipelago. These islands are hilly and mainly barren, with small areas of ricefields in river valleys. The population consists largely of fishermen; landing places are few and roads non-existent. The West Lamma channel, which has a minimum depth of 5 fm., lies between small islands off Lantau on the west and Pokliu chow on the east. The East Lamma channel between Pokliu chow and Hong Kong island is deep and has a least depth of 9 fm. The western entrance to



Hong Kong can only be approached by vessels drawing less than 24 ft., owing to a bar with a least depth of 4 fm. From the two Lamma channels the Sulphur channel, 6 fm. deep, leads round the north-western end of Hong Kong island (Plate 92).

Larger ships generally proceed by the deep Lema channel between Tamkan and the Po toi islands, and thence into the Tathong channel, which has a good anchorage. Junk bay gives protection for ships in depths of up to 5 fm., and is sheltered from typhoons. Hong Kong harbour is finally entered by a deep, narrow channel, and provides the fullest harbour facilities with a variety of anchorages.

*Communications.*—The Hong Kong territory is provided with excellent roads and a railway runs to Canton. However, a sharp degeneration in roads is seen outside the boundaries of the area administered by the Hong Kong government.

## 6. HONG KONG TO SWATOW (Figs. 43, 44, 45)

This coast consists partly of bays and partly of hilly islands and peninsulas separated by inlets of the sea. It is fraught with dangers to navigation such as shoals and submerged rocks, strong winds and typhoons. There are a number of anchorages of varied quality; immediately east of Hong Kong, Port Shelter and Rocky harbour have good anchorages, and there are several in Mirs bay which give shelter from typhoon and monsoon winds in various natural harbours, some of which are almost completely landlocked. Mirs bay has a number of towns and villages situated in small valleys with limited areas of agricultural land between hills.

Bias bay is surrounded by hills with areas of ricefields in scattered lowlands. There are several sandy beaches with shelving mudbanks, but the bay and its margins are well provided with anchorages. An anchorage in the Sanum road, Tuniang island, is sheltered from all winds except south-westerly and westerly, in depths of 7 to 8 fm. There is also suitable shelter on the north of the Tuniang in depths of over 9 fm. The eastern side of Bias bay with Harlem bay has anchorage in any convenient depth. Fanlo kong harbour, in the north-west, is shallow but provides good shelter in a typhoon. On the western side of the bay there are several good anchorages and shelter against various winds is given by Lokaup island.

Various shallow bays along the coast to Swatow are more exposed than those discussed above, and are used mainly by fishing junks. The shores include areas of swamp and sand dunes, and are indented

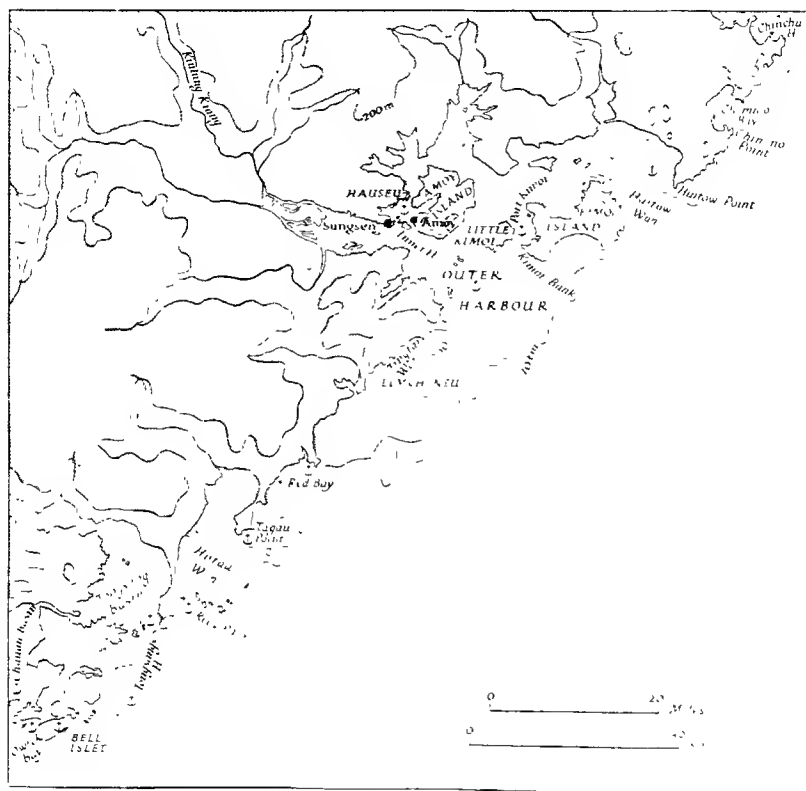


Fig. 46. Chuan Basin to Chinchu Harbour, including Amoy

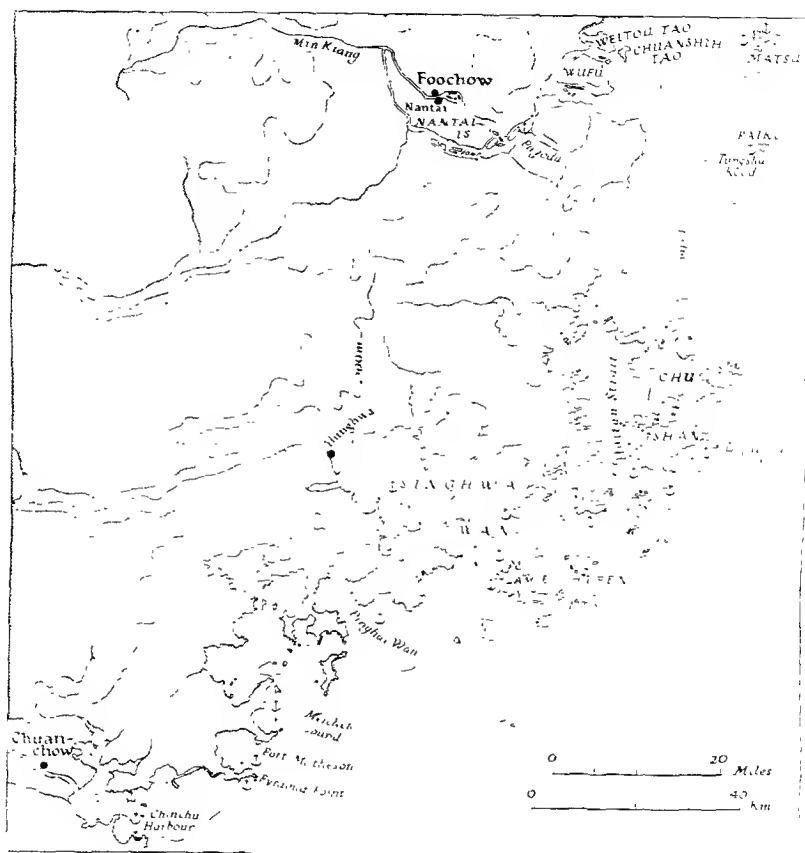


Fig. 47. Chinschu Harbour to Matsu, including Foochow

by various shallow inlets (Fig. 44). There are anchorages near Goat island in the extreme south-east of Honghai wan, and also in the Taisami inlet, with a least depth of 2 fm. Hiechechin wan has anchorages giving protection against various winds, and landing is possible at several points on the coast. Farther east, various hills reach the coast, with small river valleys draining them. Some low sandy areas fringe these lowlands, and a few suitable anchorages exist. Kupchi point anchorage is suitable for small vessels, but usually has a ground swell. Tungao road anchorage is 5 fm. deep and well protected against the north-east monsoon, but there is often heavy swell from the south. Breaker point anchorage gives shelter against the north-east monsoon in depths of 5 fm. Hope bay has secure anchorage during the north-east monsoon, but local knowledge is necessary. The anchorages in this section are greatly inferior to those east of Fokai point.

*Communications.*—The railway from Canton to Kowloon reaches Tolo harbour in Mirs bay. The road from Waichow to Hoifung connects various centres some distance inland. It is of moderate quality and capable of carrying arms and transport to Pingshan, east of which it becomes very poor. There are branch roads from Hoifung to various centres in Honghai wan, and the road continues to Chaochow from Hoifung.

## 7. SWATOW TO AMOY (Figs. 45, 46)

Swatow is the shipping port for Chaochow, with which it is connected by a river channel navigable for small boats. The delta of the Han kiang, which is joined by the shorter river Kiyang, covers a lowland area of approximately 600 square miles, intensely cultivated and densely populated, around Swatow, Chaoyang and Chaochow. There are hills on the south of the entrance to the river, and three hilly islands with a large tract of reclaimed land on the north, but on both banks there are large extensive stretches of drying mud. Swatow is a town of 179,000 people, and can be reached by vessels with a draught of 20 ft. The Han delta stretches for twenty miles eastwards, beyond which the coastal region consists of salt pans, sand dunes, or cultivated fields backed by hills. There are a number of 'tied islands' ('tombolos') consisting of hilly islands joined to the main by a sandy isthmus. The so-called 'dumb-bell' islands, which consist of two hill areas linked by a sandy isthmus, also occur. To add to the variety of the coast

there are shallow bays with shoals, about which exact information is generally lacking. The result of this variety of features is to make navigation difficult and anchorages very significant.

The hilly and barren island of Namoa rises to over 1,900 ft., and is populated mainly by fishing communities. There are a few good anchorages along this coast, of which South bay gives shelter against the north-east monsoon and Clipper road, to the west of Namoa, gives protection from the south-west monsoon. There is a third anchorage at the entrance to Challum bay in depths of 5 to 6 fm. Chauan bay anchorage is useful only during the south-west monsoon. Anchorages in Owick bay,  $3\frac{1}{2}$  fm. deep and near Bell islet, 7 fm. deep, are sheltered from northerly winds. All these anchorages are obstructed at times by fishing stakes. Clipper road, mentioned above, and Tongsang harbour are suitable for use during typhoons. In Rees pass, in the south-west of Hutau wan, there is anchorage in a depth of 6 fm. At the north-east end of the bay, shelter from north winds in depths of 4 to 6 fm. may be obtained to the south of Tagau point. Red bay gives fairly good anchorage for small ships against the north-east monsoon, but the navigation of this coast as far as Amoy harbour is difficult, owing to the large number of islands, shoals and patches of shallow water. Temporary shelter for small vessels against the north-east monsoon exists near Limchinsu and in Tingtai wan.

*Communications.*—The road from Swatow to Amoy is reported as good and lightly metalled from Ungkung to Amoy, but coastal travel is largely by water in spite of all navigational difficulties.

#### 8. AMOY TO FOOCHOW (Figs. 46, 47)

Amoy lies at the mouth of the Kiulung kiang and is a port available for vessels of any draught at all times. On the south-west the coast consists of several rocky points and sandy bays, with various reefs and islands. Kimoi island, on the north, has low hills near the coast, with a cultivated fringe and a sandy beach. In the south-west the hills fall sharply to the sea, and Kimoi bank runs southwards for three miles, drying in places and forming a great danger to navigation. Little Kimoi island consists of a hilly part in the north-east and sandhills with cultivated ground in the south-west. Between these islands is Port Kimoi, a good anchorage except with southerly winds.



Plate 93. Amoy, Fukien

The photograph includes part of Kulangsu island (foreground), the Inner harbour, and the town itself on Amoy island.



Plate 94. Foochow, Fukien

This view of the upper city shows timber rafts in the foreground and a variety of craft in the Min river.



Plate 95. Chuanshih tao (Sharp Peak island), Fukien

This hilly island at the mouth of the Min kiang has terrace cultivation on remarkably steep slopes. The cable station of the Eastern Extension Telegraph Company is seen on the right.



Plate 96. Wenchow, Chekiang

The entrance to the outer harbour is through a deep channel between islands; it has depths of 7 to 16 fm. and anchorage in good holding ground. Amoy island lies on the north opposite an extensive shoal backed by mudflats, some of which have oyster beds. The country consists everywhere of hills interspersed with cultivated lowlands. The inner harbour has various dangers and pilotage is necessary. There are various mooring buoys and a good anchorage exists between the small island of Hauseu and Amoy island itself. There are roads from Sungseu on the mainland into the hills and various centres in the south (Plate 93).

The coast north of Amoy to the river Min is indented by several large bays with outlying islands. Hilly areas are interspersed with lowlands and some of the coasts consist of sand dunes, which are 300 ft. high between Huitow point and Chimmo point, guarding cultivated areas. In Huitow wan the hazards are numerous, but during the north-east monsoon there are anchorages in depths of  $3\frac{1}{2}$  to 5 fm. Between Huitow point and Chimmo point there are several shelterless bays, such as Chimmo bay, which has barren shores and is unsafe during the south-east monsoon. All the small bays along the coast northwards to Chinchu harbour are indifferent. The intricate channels leading to the once-famous port of Ch'üanchow are now silted up and its trade is drawn to Amoy. There are various anchorages of limited value between Chinchu harbour and Singhwa wan. There is shelter for small ships during the north-east monsoon near Pyramid point, in Port Matheson, Meichow sound and Pinghai wan.

Near Singhwa wan the mainland is densely populated, and many of the islands are also populated, partly by fishing communities. Access to Singhwa wan is available by two channels around a complex archipelago called the Eighteen Yits. There are anchorages in both these channels and also in Singhwa wan, which has many islets and dangers and is not easy to navigate. Small ships can reach Hunghwa village, but no port of significance has developed in this area.

Chu shan has very little cultivated land, and consists of hills linked by sandy areas with dunes. Anchorage may be obtained south of Hai head in a depth of about 5 fm. The islands east of Hai head are a great danger to navigation, and there is little attraction for shipping on the eastern side of this island. Passage of the Haitan strait is not possible for vessels of more than 22 ft. draught, as it is encumbered by islets, rocks and shoals. It has an anchorage



giving shelter against typhoons in the south entrance. The mainland consists of hills and cultivated lowlands with banks of mud and sand on the coast giving place to a sand dune coast towards the estuary of the river Min.

*Communications.*—Roads run from Sungseu into the hills, but the railway to Changchow has been derelict since 1918. There is a road from Sungseu to Foochow which is suitable for all types of traffic, and lightly metalled in parts. It crosses the various estuaries and inlets a few miles from the open sea, but can hardly be regarded as a coastal road. Like many roads in China, it is most significant as an adjunct to navigation. There are ferries at Foochow and Amoy.

#### 9. FOOCHOW TO WENCHOW (Figs. 47, 48, 49)

Foochow is a crowded town with a population estimated at half a million. It collects the commerce of the Min drainage basin, which is brought largely by junks, but it is difficult to approach and not a first-class port. Vessels anchor outside the estuary while waiting to enter the roadstead off Matsu, a hilly, well-populated and cultivated island, Tongki island or the Paikuen islands. The river winds through cultivated lowlands with hills behind them, and the main channel runs to the south of Chuanshih tao and Weitou tao: the bar, which extends for eight miles from the south-east extremity of Wufu, has a least depth of 14 ft. with  $10\frac{1}{2}$  ft. in the inner bar. Many navigational difficulties exist, and the Pagoda anchorage, twenty-two miles above the outer bar and eleven miles below Foochow, is in effect the port of Foochow. The Min River Conservancy Board has made extensive improvements between Pagoda anchorage and Nantai, eight and a half miles farther up the river, by means of training walls and dredging. The navigation channel was dredged (1936) to a minimum depth of 17 ft. at high water neaps and 20 ft. at high water springs, and at these times vessels of 15 ft. or 18 ft. can reach Nantai, and vessels of about 12 ft. draught can reach Foochow (Plates 94, 95).

The coast between Foochow and Wenchow consists mainly of hill ranges dividing intensively cultivated lowlands. Fishing is widely practised by the population on the mainland and islands, and fishing stakes are a frequent danger to navigation. Loyuan wan gives anchorage in its entrance during typhoons, and consists of a deep channel between hilly coasts leading into a shoaly bay, with extensive areas of ricefields on the surrounding lowlands. Santu ao

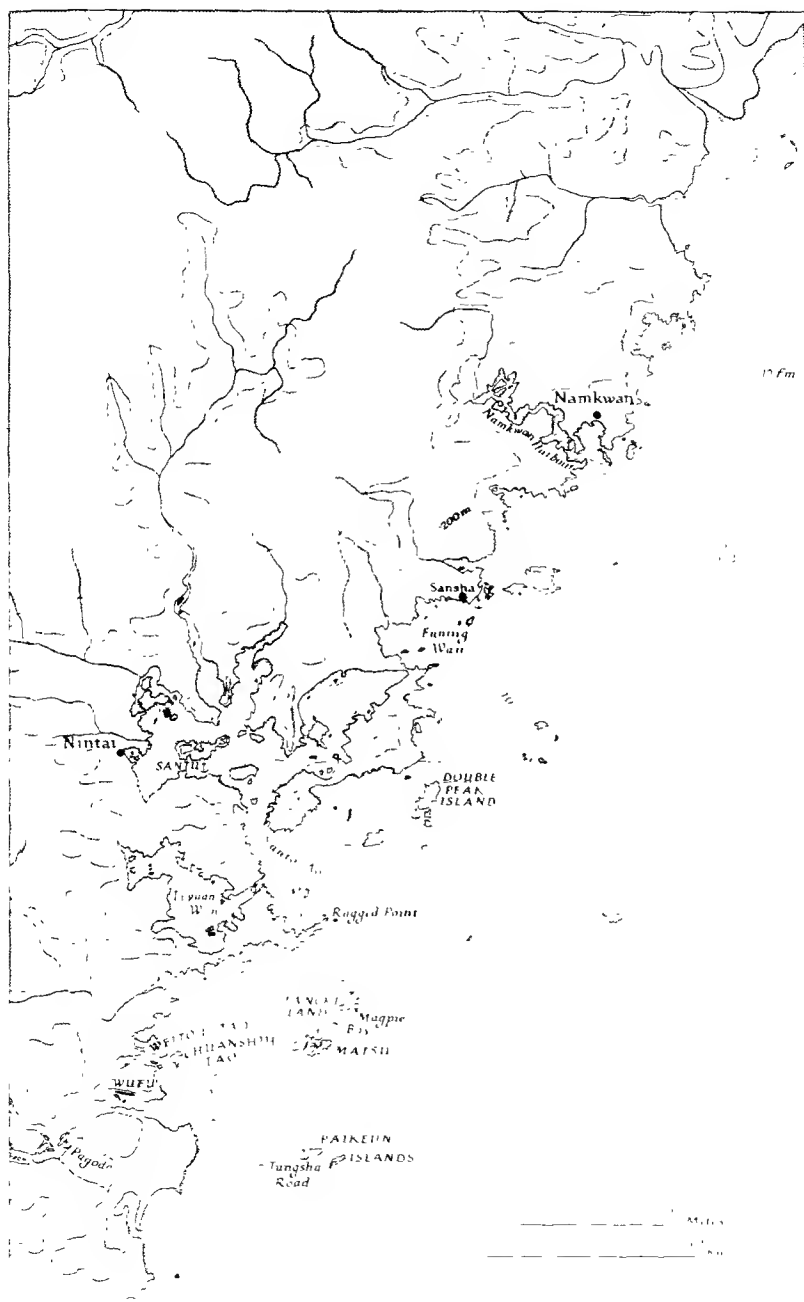


Fig. 48. Foochow to Namkwan

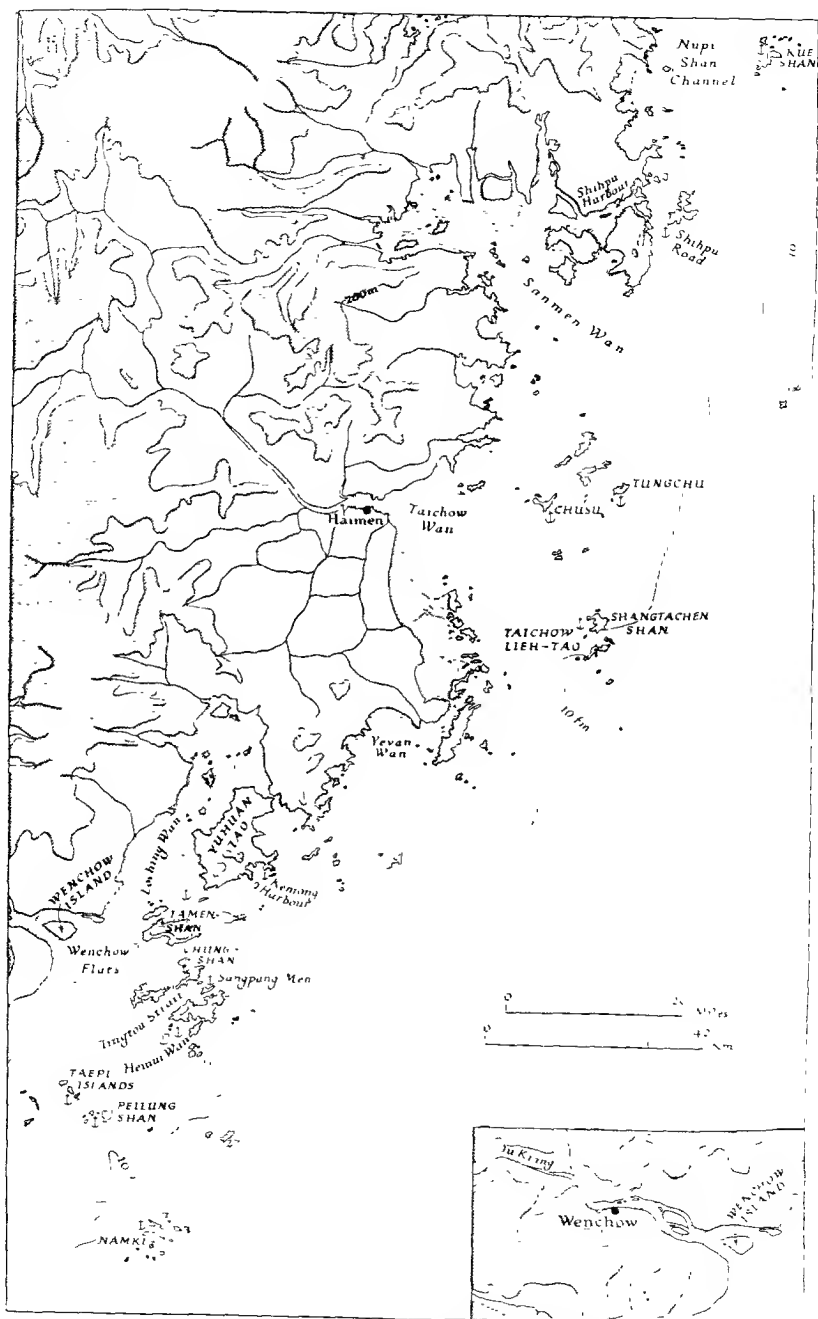


Fig. 49. Wenchow to Nupi Shan Channel

is an inlet with many waterways between hilly islands and peninsulas, with terraced hills and small cultivated lowlands. The magnificent Santu anchorage has depths of 5 to 17 fm. and is a wonderful natural harbour serving only a restricted area. The town of Nintai is approached by shallow channels through mudflats.

Double Peak island has a good anchorage, sheltered by two small islands, in the north-east monsoon. The coast northwards to Namkwan harbour is not well known, but anchorages for small vessels occur off Sansha village, Funing wan, in  $4\frac{1}{2}$  fm. and in Namkwan harbour, 3 to 14 fm., an inlet similar to Loyuan wan suitable for use during typhoons. The fishing stakes common in bays on this coast are abundant in the entrance to Namkwan harbour, and there are also mooring posts for sampans. The inner bay is very shallow, and the walled town of Namkwan is outside the harbour and not very easy of access owing to shoals. From Namkwan to the Ou kiang estuary the coast consists of headlands and shallow bays. Anchorages near the Taepi islands, Peilung shan and Namki island are available with local knowledge.

The entrance to the Ou kiang is guarded by hilly islands flanked with mudbanks. Many of the channels are full of shoals and useless for navigation, but there are a number of anchorages, such as Heiniu wan, which give shelter against typhoons, at the eastern entrance to Sanpang men and also near Chung shan during the south-west monsoon. The north passage lies between Chung shan and Tamen shan and ships sail to the north of the Wenchow flats.

The cultivated island of Wenchow lies at the western end of the flats, and marks the entrance to the river estuary. The country along the estuary has sharp headlands, alternating with closely settled agricultural plains guarded from flooding by embankments. There are two cultivated islands in the river and the buoyed channel to Wenchow runs through various shoals. The port receives vessels drawing 15 to 20 ft. From Wenchow, which has a population of 200,000, craft of 20 tons can ascend the river for about thirty miles above the city, where rapids begin and the tidal influence ends. Smaller craft can travel a further sixty miles to Chuchow (Plate 96).

*Communications.*—Foochow has no railway, though a line from Nanchang is projected. River communication is still of major significance, although the town is connected with roads running near the coast and up the Min valley. The Amoy-Foochow road is continued to Wenchow and is of indifferent quality, with frequent washouts. Another road from Foochow with a poor surface follows

the Min river, and then strikes through mountainous country to reach the upper part of the Min river basin, where the road is metalled and well constructed.

#### 10. WENCHOW TO NIMROD SOUND (Figs. 49, 50)

The coast from Wenchow bay to Nimrod sound consists of headlands with shallow inlets, extensive shoal areas and a number of islands. Loching wan, which lies between Yuhuan tao and the islands around the Ou kiang, has a good anchorage, 5 to 8 fm. deep, available in a typhoon. A second anchorage in Kemong harbour is available only for small ships. Huenman wan and Yevan wan consist largely of shoals, with some islands and there are extensive shoals in Taichow wan. The Taichow lieh-tao have a good anchorage to the west of Shangtachen shan. Taichow wan is very shallow and a shallow channel runs through the flats to the town of Haimen. The anchorages near Chusu and Tungchu are only suitable for use with local knowledge. Sanmen wan has several islands, reefs and submerged rocks, and is generally dangerous for navigation. Shihpu harbour and its approaches offer almost equal difficulties and Shihpu road is an indifferent anchorage with strong tidal streams and usually a heavy swell.

The Nupi shan channel is part of an inshore route between various groups of islands. The mainland coasts consist of hilly areas and promontories between densely settled lowlands and there are extensive mudflats in shallow bays and few places where landing is convenient. In the islands, the population consists of fishing communities, and many of the shoal areas are covered with fishing stakes. There are anchorages in the Kue shan and to the south-west of Luhwang shan, and in fine weather almost anywhere between Luhwang shan and Nimrod sound.

Nimrod sound is the most northerly of the great inlets between the Si kiang and the Yangtze kiang and extends inland for twenty-five miles (Fig. 50). The outer part, for eleven miles within the entrance, is nowhere less than one-and-a-half miles wide, and is almost entirely free from dangers apart from fishing stakes. It has various landing places and important anchorages and the countryside is very densely peopled and highly cultivated. The inner part of the sound has various islands and a number of landing places on the south side. An anchorage between Entrance island and the Paza islands is entirely landlocked, and gives good shelter in a typhoon. There

is a further anchorage to the west of the Paza islands in depths of  $6\frac{1}{2}$  fm. The waters at the head of the sound are divided into two parts by a hilly peninsula, and the sound ends in shoals.

*Communications.*—There is no reliable information on the roads around Wenchow. No large centre has arisen in Nimrod sound, although the lowlands are densely populated. There is road communication with Ningpo, the terminus of the railway from Hangchow, from a point on the north of Nimrod sound, and also a road passing through various villages at the extreme inner limit of the sound.

## II. THE CHUSAN ARCHIPELAGO (Fig. 50)

The Chusan archipelago stretches for thirty-five miles north-eastwards from Luhwang shan and consists of bold and rugged islands with sharp lines of treeless hills and rich valleys and lowlands. Some islands are fringed by shoals, and have reclaimed areas protected from the sea by embankments. The sea in this region is heavily impregnated with mud, which is largely the waste of the Yangtze river. The archipelago includes a number of small islands, and the dangers to navigation are mitigated by the existence of remarkably deep channels between the major islands (Plates 58, 97).

Port Rouse, to the east of Luhwang shan, is a convenient shelter for boats waiting for favourable tides to enter Tansau mun, a deep channel which has a good anchorage 10 fm. deep, west of Fojia. The Heachi mun, between Hoji and Tauhwa shan, is divided into several deep channels towards its western end, and anchorages are available. The Sarah Galley channel is more intricate than those described above and the entry to the Rambler channel is difficult. The Freemantle channel is the most usual course from the Sarah Galley channel.

These channels lead to the Fatu channel, which is connected at its southern end with the Nupi shan channel and Nimrod sound by three channels between islands. Of these, the Gough pass is free from danger; it is half a mile wide at its narrowest part and has a deep fairway. Extensive anchorages are available off the north coast of Luhwang shan in depths of 13 fm., and also in moderate depths between the Damson islands and Ketau point. The mainland here has rice and cotton fields in well-populated lowlands, with hillsides terraced up to about 800 ft.

Chusan island is the largest in the archipelago and is mountainous, reaching 1,600 ft. in Chusan East peak. The lowlands and many of the hillsides are intensively cultivated and the island is thickly populated. The capital is Tinghai, a walled town half a mile from the sea, with a harbour on the coast. A number of islands lie in the approach to Tinghai, and the safest approach is from the Tower hill channel through Haji ko, and thence around the island of Bunji through the North Bunji channel. The harbour has depths of 3-8 fm., and there are anchorages in the outer part of the harbour, and at the extreme eastern end of the bay, in a depth of 12 fm. Along the southern shores of Chusan there is an inshore passage, the Sinkea channel, and an anchorage which gives shelter in a typhoon. There are various islands to the east and south-east of Chusan; an anchorage on the south side of Putu is 12-14 fm. deep.

The northern group of the Chusan archipelago extends for nearly fifty miles from Video on the east to Yuhsing nao on the west. Many of the islands rise to over 700 ft., and Video has anchorages off the south-west coast in depths of 13-17 fm., sheltered from north to east winds, and off the north coast in depths of 11-14 fm., sheltered from south and south-west winds. The Fisherman islands have a small anchorage off the inhabited South Fisherman islands, in depths of 10 fm., and there is another anchorage on the south-west side of Middle Fisherman island in depths of 6-7 fm. Steep island pass, which is deep and free from dangers, to the west of the Fisherman islands, is the most frequented of the various passages between the islands west of Video. Most of the passages farther west are used only by junks. Anchorages exist off the south-west coast of Hall island, and also off the boat harbour on the north of this island, in depths of 10-14 fm.

Chang tao major and minor are larger islands than those farther east, and an excellent landlocked harbour between them is the best anchorage in the approach of the Yangtze. Several vessels may be accommodated in depths of 5-13 fm., but it is not suitable for ships of more than 24 ft. draught. The larger ships enter from the deep Tai shan channel which runs between Tai shan and the Chang tao islands. Tai shan is a hilly island standing on extensive mudbanks. Between this island and Chusan there are many islands, but the channels between them, though deep, are narrow, intricate and available only with local knowledge. There is also a lack of suitable anchorages.

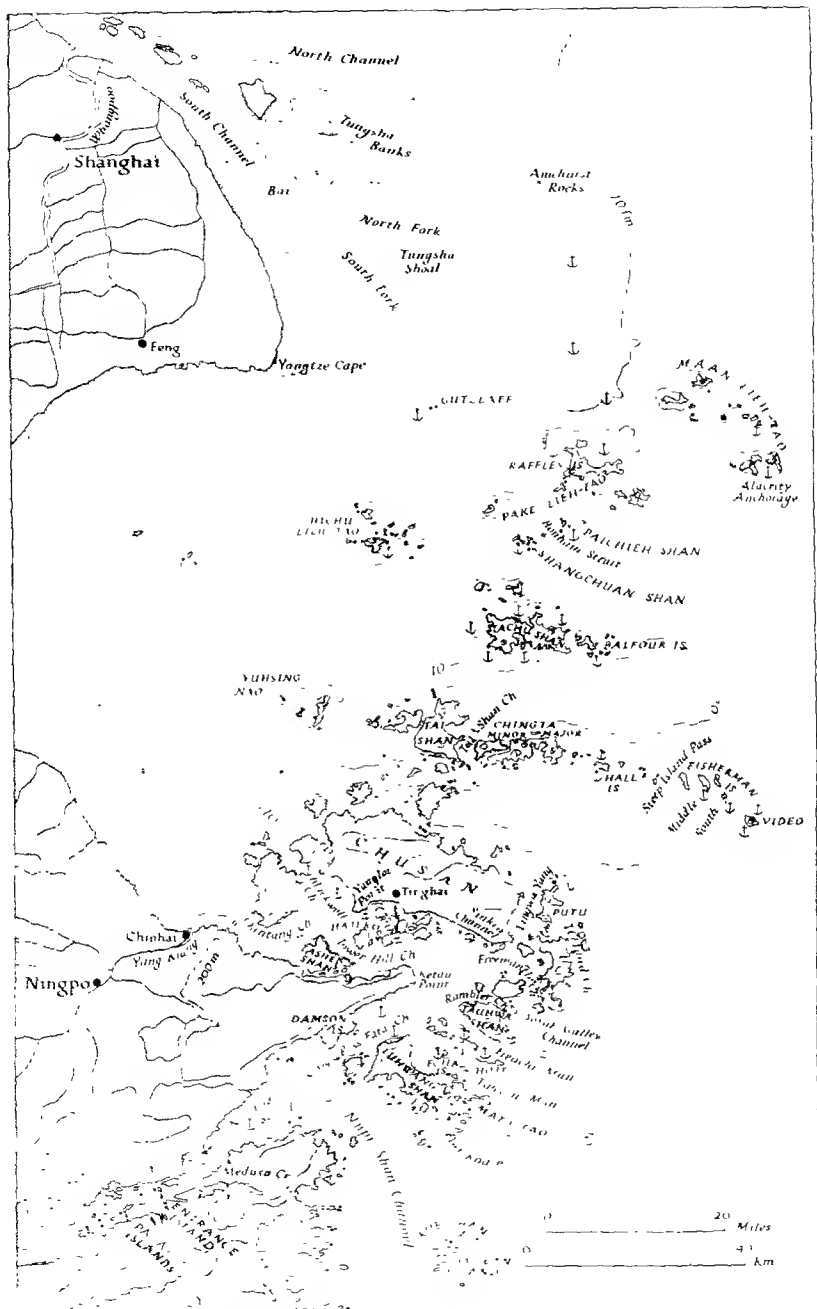


FIG. 50. Nimrod Sound to the Yangtze entrance





*Islands north of Chusan*

The four major groups of islands between the Chusan archipelago and the Yangtze estuary are similar in form to the islands farther south and carry the north-east trend of the Chusan archipelago across the sea routes to the Yangtze kiang. Various dangers include shoals, rocks and rapid tidal streams, but a number of suitable anchorages exist. All waters less than 10 fm. deep are liable to be obstructed by fishing stakes.

The Tachu shan, the largest island of its group, has cultivated plains and is densely populated and rises to over 1,000 ft. The coast is indented by numerous bays filled with mudflats and anchorage is possible off any part of the island. The Balfour islands form a small group with deep channels on either side, and anchorages off the south in depths of 5-7 fm. The Pake lieh-tao (Parker islands) lie to the north around Bonham strait which is generally used by steamships from the south or south-west bound for the Yangtze. Anchorages in certain parts of this group give shelter against strong winds. In the south-west there is shelter against typhoons in a depth of 10 fm. off the south of Shangchuan shan (Davis island). A deep anchorage off the south-east side of Paichieh shan is sheltered from north-west winds, but elsewhere around this island the anchorages, though deep and sheltered from north and north-east winds, are indifferent with marked tidal eddies. Around Raffles island, the largest of the group, there is anchorage on the north and west in depths of 4-8 fm.

Maan lieh-tao (Saddle islands) are divided into two by a deep clear channel over two miles wide. Several of the islands are inhabited largely by fishing communities and there are a number of good anchorages, including Alacrity anchorage which is protected by east and south Saddle islands and has good shelter against winds from east, north and west in depths of 7-10 fm. Chichu lieh-tao, a few miles west of the three groups just considered, are small and rugged with many outlying rocks and reefs. There is good anchorage in a depth of 4-6 fm. off a bay on the east side of Tayang. The isolated island of Tachi shan (Gutzlaff) has a well-known meteorological station, and an anchorage. In fine weather ships may anchor almost anywhere between Maan lieh-tao, Tachi shan and the Amehurst rocks which, however, generally have many fishing boats and nets in the vicinity.

## 12. HANGCHOW WAN (Figs. 50, 51)

Hangchow wan is entered by various passages through the Chusan archipelago, notably the deep Tower hill, Blackwall and Chintang channels. There are anchorages in moderate depths near the Blackwall channel. Chintang channel lies between Chintang island and Taishei shan. The islands consist of ranges of hills with cultivated lowlands, and are fringed by mudbanks. The mainland has an extensive and highly cultivated area of lowland. There are no anchorages on the mainland side of the channel, but an anchorage off the east coast of Chintang island is 8-10 fm. deep.

Hangchow wan is funnel-shaped, and the tide, rushing up to meet the waters of the Tsientang kiang, forms one of the most remarkable bores in the world. At times it is a wall of water 19 ft. high. Deep waters lie in the approaches, but the present coastline around the bay represents the steady conquest of mudbanks and shallow water by dyke construction during several hundred years. A balance has been struck between land and sea: on the north shore no channel drains into the bay for all the waters are led off through a maze of creeks and canals to the Whangpoo at Shanghai. (See p. 105, Fig. 32, and Plate 56.)

Mudbanks along both the northern and southern shores of the bay dry out to as much as two miles in places. Chapu, on the north side, was formerly the port for Hangchow, but it is now little more than a fishing village with an anchorage. The Yung kiang, on the south, is a river which may be used by ships of 10 ft. draught at any state of the tide. It is usually crowded with junks going to Ningpo, a town of 200,000 people, which has an outpost in Chinhai. Ships anchor in the entrance to the Yung kiang. River communication extends to Yuyao by launches, junks and boats.

Only ships with a draught of less than 3 ft. can reach Hangchow which, with over half a million inhabitants, is the political, economic and administrative centre of Chekiang province rather than a great commercial town. Ningpo never captured its trade, and the commerce of the Hangchow region has contributed to the rise of Shanghai. The Grand Canal terminates at Hangchow, and many other canals and creeks lead into the Yangtze delta (Plate 97).

*Communications.*—Hangchow has railways running to Ningpo, Shanghai and Nanchang, but parts of these lines have been destroyed during hostilities. Before the war with Japan, an extensive programme of road building was begun in Chekiang province, but the

present state of the roads is uncertain. A road from Ningpo formerly running inland to Chinghsin and Lishui has been destroyed over the first twenty miles, but the remainder is metalled and in reasonable condition. A road from Hangchow to Shanghai passes through Haining and Chapu and follows the coast as far as Fenghsien. The road is 18-20 ft. wide, but much of it is unsurfaced and of poor quality. It is doubtful whether the road is usable throughout its whole length.

### 13. THE YANGTZE KIANG (Figs. 50, 51, 52)

#### *The Yangtze delta (Figs. 50, 51)*

The only entrance available for sea-going ships is the South channel, which is divided into two sub-channels by the Tungsha shoal. The deeper South fork has a minimum depth of 18 ft., but ships may be delayed for hours or even days at the Yangtze bar. The Whangpoo may be entered by any ship whose draught permits passage through the South channel, but the larger ships can cross the Yangtze bar on only six days in the month, and only during four hours of those days when the tides are exceptionally high. As a result of various harbour improvements a minimum navigable depth of 31 ft. is maintained to Shanghai.

Ships anchor near Woosung and enter the Whangpoo harbour, where most are berthed at wharves, but some lie in the stream. The harbour and creeks, of which the Soochow creek is very important, are crowded with all kinds of Chinese craft from large five-masted junks to sampans. The area is difficult to navigate and local knowledge or pilotage is essential. In spite of all its difficulties, Shanghai is the most important centre of foreign trade in China. Since 1842, when Shanghai was opened to international commerce, it has risen from a minor city to one of the chief ports of the world. (See p. 107, Fig. 32, and Plates 52, 98.)

*Communications.*—Shanghai has railway communication with Woosung, Hangchow and Nanking, and water communication for at least fifty miles in every direction by numerous canals and creeks. There is a road to Hangchow, mentioned above, and another to Wusih which carried a bus route until recently.

#### *River Levels*

The Yangtze kiang carries ocean-going steamers as far as Hankow, and has a number of significant ports of which none

is equal to Shanghai. The rise and fall due to the tidal wave is recognizable as far as Tatung, 350 miles from the sea, but is of no significance above Wuhu, sixty miles lower down the river. The wash of shipping in the river endangers the embankments on either side, and the lowlands are liable to frequent floods (p. 95). The following table shows the difference in level between the river at its maximum, usually in July, and its minimum, generally in January. The seasonal variations are due to the changing flow of the rivers draining the basin, and there are considerable fluctuations from year to year. The navigation of the river is only practicable with the help of local information.

Port	Distance from Woosung bar in miles	Difference between high water and low water in ft.	Draught reaching port		Opened as treaty port
			Low level	High level	
Chinkiang	150	12	<div style="display: flex; align-items: center; justify-content: center;"> <div style="font-size: 3em; margin-right: 5px;">{</div> <div style="text-align: center;"> 27 Some- times only 24 24 </div> </div>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">32</div> <div>M.H.W.S.</div> </div>	1861
Nanking ..	198	18			1858
Wuhu ..	250	21			1876
Kiukiang	447	35	<div style="display: flex; align-items: center; justify-content: center;"> <div style="font-size: 3em; margin-right: 5px;">}</div> <div style="text-align: center;"> 15 10 </div> </div>	<div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 5px;">27</div> <div>M.H.W.S.</div> </div>	1861
Hankow ..	584	38			1858

### *Shanghai to Nanking (Fig. 51)*

The river for eighty miles above the entrance to the Whangpoo has a breadth of two to ten miles, but the navigable channel is much narrower, and liable to constant change owing to sand and mudbanks. There are anchorages at Woosung, and also slightly west of the Centaur crossing. The estuary merges into the river near Kiangyin, a typical walled town connected to the Yangtze by a creek usually crowded with junks. The river above Kiangyin is one to two miles in width, with several creeks intersecting the banks, and the country on either side is low and flat with carefully cultivated fields. Chinkiang is approached by channels whose variable width determines which ships can proceed up the river. Around Chinkiang hills and lines of upland are seen to the south of the river (Plate 99).

Chinkiang, a town of 171,000 people, lies at the junction of the Grand Canal with the Yangtze, in an area of great fertility. The



Plate 97. Coast near Ningpo, Chekiang

These small islands of the Chusan archipelago lie at the entrance to the Yung kiang. The boats are part of the Ningpo fishing fleet.

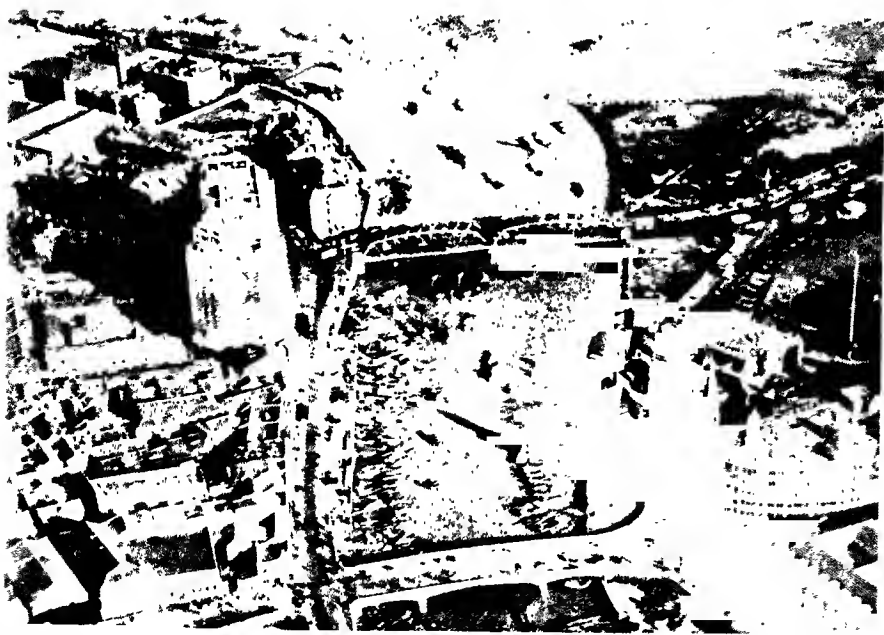


Plate 98 Aerial view of Shanghai

The junction of the Whangpoo with Soochow creek near Garden bridge



Plate 99. Chinkiang, Kiangsu

The Grand Canal runs through the town and gives communication with Hangchow.



Plate 100. Wuhu, Anhwei

A river steamer at the landing stage of this important river port.

railway from Shanghai to Nanking passes through the town. The river in the vicinity of Chinkiang is constantly changing, but there is a good anchorage. From Chinkiang to Nanking the right bank is backed by ranges of hills, and the left bank consists largely of lowland broken by a few hills. Many of the islands in the river are partly covered with reeds and partly cultivated. On the south side of the river there are stretches of land which are flooded at high water. These become a more frequent feature of the landscape farther up the Yangtze as the difference between low and high water level gradually increases. A few creeks on the north side lead to small towns, such as Icheng. At Nanking the river has a channel with very great depths even at low water levels, but the landing places are poor and not suited to steamboats. There are three suitable anchorages in the river. Timber rafts constructed of medium-sized spars known as Hankow poles may cover half an acre and draw 15 ft. of water and are a menace to navigation. They are encountered between the Tungting lake and Chinkiang, and are finally broken up some miles farther east.

*Communications.*—Nanking is a terminus of a railway from Shanghai. This line runs near the river bank for several miles on embankments or is protected by the not invulnerable dykes. The line from Tientsin reaches Pukow on the opposite bank of the river, and a ferry connection exists. There is a road to Chinkiang and a road to Wuhu has been used as a bus route.

### *Nanking to Kiukiang (Figs. 51, 52)*

The general trend of the river between Nanking and Kiukiang is south-westerly with a fairly constant width of three-quarters of a mile between the banks on either side of the channel. In places the width of the river is as much as five miles and there are several islands covered with reeds and cultivated land in varied proportions. The land to the south-east of the river is more hilly than that to the north-west, but along both banks some areas are flooded at high water and have reeds in profusion. Wuhu is a walled city fifty-two miles above Nanking. The Yangki kiang is navigable to Ningkwo and rivers provide water communication over an extensive agricultural hinterland. Produce is brought to Wuhu, the market centre for Anhwei province, by boats along several creeks on the left bank of the river (Plate 100).

Between Wuhu and Hukow the river has several islands which are mainly cultivated but liable to be covered in places at high water.



Considerable areas along the banks are inundated at high levels of the river. Beyond the areas regularly flooded there are richly cultivated areas, and even in the uplands the valleys are tilled and slopes terraced.

At Hukow the waters drained through the Poyang hu reach the Yangtze. Differing markedly in summer and winter, this lake is of importance for local shipping. In winter only ships of light draught, 2-3 ft., can proceed through channels which wander through the marshes representing the lake of summer, when ships of 10 ft. draught can visit any town on the lake. A sheltered anchorage exists off Hukow, and there are channels to Kiukiang running to the north and south of Oliphant island. The channel to the north is generally used, and the island, though liable to floods, is cultivated and closely settled.

Kiukiang is a town of some 90,000 people, and the terminus of a railway from Nanchang, eighty-seven miles away. The river near Kiukiang is deep, rapid and turbulent with north-east winds. Anchorage is possible under the shelter of Oliphant island, and there is also a limited area suitable for anchorage in the river. Kiukiang is near to the channels of inland navigation serving Anhwei and Kiangsi provinces. These include the routes through the Poyang hu, and steam launches run from Kiukiang to Nanchang.

*Communications.*—The various water routes are most significant. The railway from Nanking runs along the right bank of the river on embankments to Wuhu and thence inland to Ningkwo. Another line runs from Kiukiang to Nanchang.

### *Kiukiang to Hankow (Fig. 52)*

From Kiukiang to Hankow the river has a fairly constant width of three-quarters of a mile between banks limiting the channels. There are hills on both sides of the river, but the area of lowland is more extensive on the north side. The problem of flooding becomes much more serious in this area. When the level of water in the Hankow river gauge is above 35 ft. some river banks are covered and lowlands partly flooded. If the level reaches 40 ft. most of the lowland areas are inundated, and at 45 ft. they are converted into one vast lake. These floods cause immeasurable problems for the inhabitants of the lowlands and also make navigation very difficult. (See p. 95, Fig. 31, Plate 45.)

There are several lakes in the lowlands which, like the Poyang, have a marked seasonal variation in extent. The channels in the

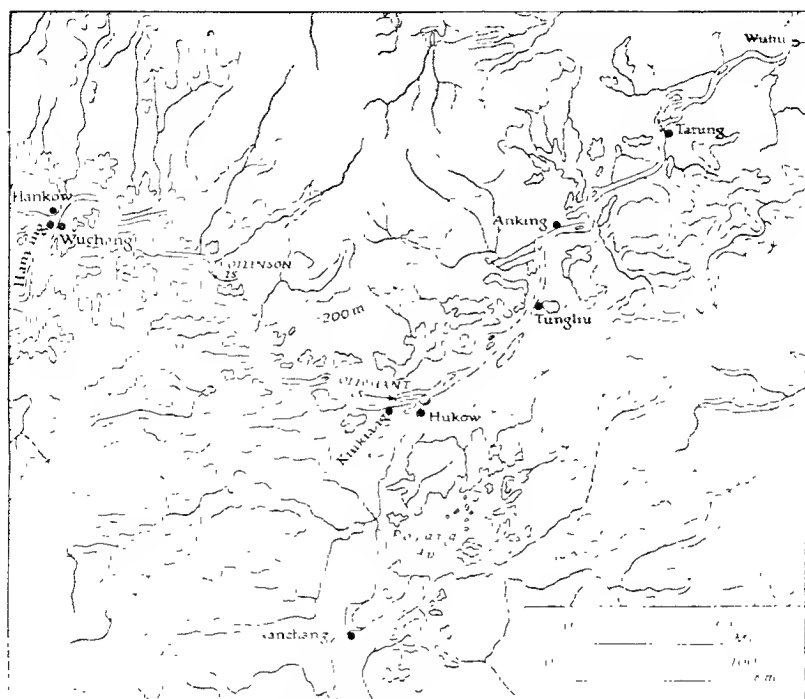


Fig 52. The Yangtze Kiang, from Wuhu to Hankow

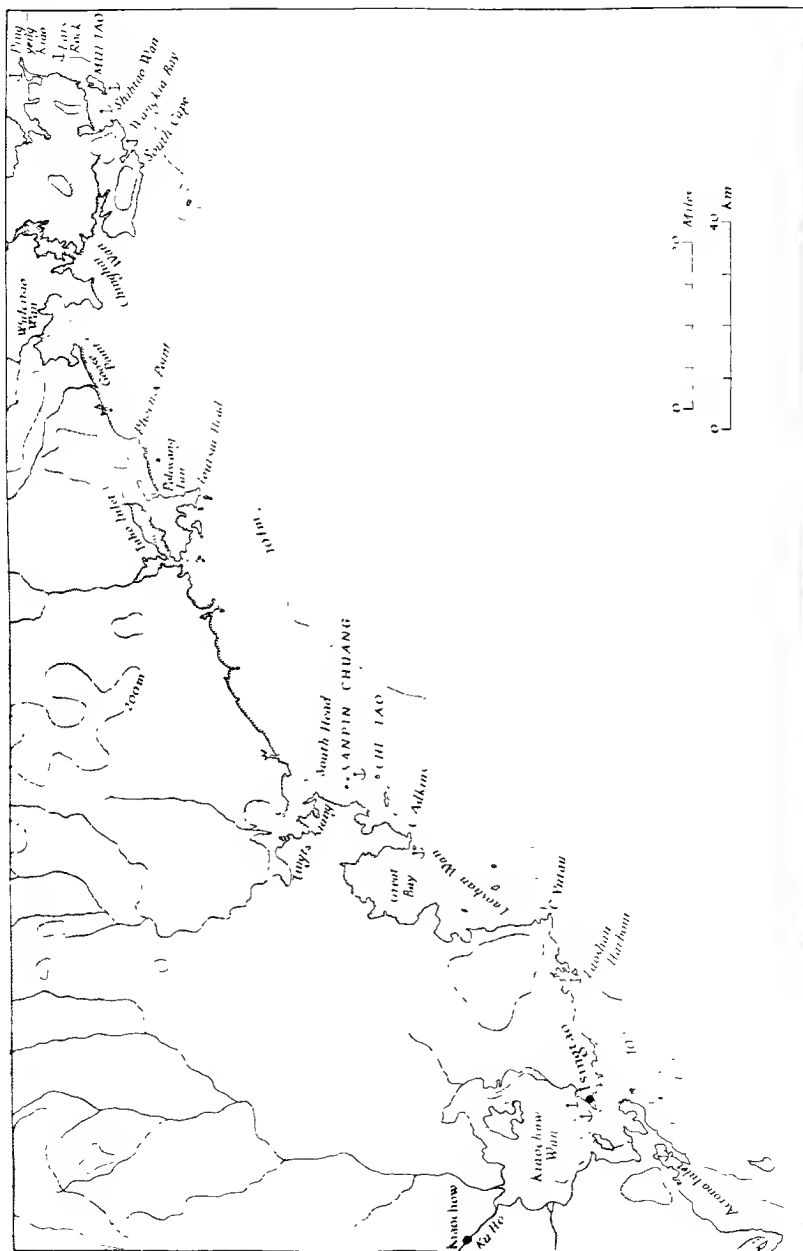


Fig. 53. Kiaochow Wan to South Cape

neighbourhood of Collinson island are subject to constant change and form one of the critical areas in the navigation of the river. From this area to Hankow the channel passes through reaches with islands and shoals in places, and the lowlands on either side of the river are sharply menaced by floods. The Hankow crossing, over a bar about three miles below Hankow, frequently limits the draught of ships entering the harbour. Hankow, where the river is about three-quarters of a mile wide, is the chief port of the central Yangtze basin. The Han, though narrow, is navigable for 300 miles, and brings an enormous quantity of junk traffic to Hankow. Steam vessels run regularly to Ichang, at the entrance to the Yangtze gorges. Some of these are 250 ft. long, 40 ft. wide with a draught of  $5\frac{1}{2}$  ft.; ships with a draught of 14 ft. can reach Ichang during the summer. At Ichang the commerce brought in junks from the Szechwan Basin is collected, and carried on to Hankow, a great distributing centre. Other steamers run to Changsha on the Siang kiang during the summer, and there is junk traffic throughout the year (Plate 101).

*Communications.*—Water communication has contributed most to the commercial prosperity of Hankow. The railway to Canton was finally completed in 1936, but has been partly dismantled in the course of military operations. Railway communications to Peiping also existed until recently, and the full working of the line will presumably be restored in due course. The road from Hankow to Ichang runs through the northern part of the Central Basin, avoiding the lower land. It is said to be impassable after heavy rain, but at one time carried a bus service. There is a road northwards to Hwangchan, following generally the line of the trunk railway to Peiping. The road from Wuchang to Changsha is 270 miles long. Though wide enough for two-way traffic it has only a sufficient width of metalling for one-way traffic. The road is in very bad condition for the first twenty miles from Wuchang, but elsewhere is reasonably good. It is a part of the Hankow-Canton-Kowloon road, and runs generally parallel to the railway. However, it has been torn up south of Changsha for eighty miles to Hengshan.

#### 14. EASTERN KIANGSU (Fig. 51)

The coasts of the Yellow sea (Hwang hai) are little known for over 200 miles north of the Yangtze. Saline alluvium is widely developed; much of it has been accumulated on the seaward side

of a dyke built nearly a thousand years ago under the Sung dynasty. The coast of Kiangsu is now the most significant single area of sea salt production in China. A main sea dyke cuts off the evaporation pans from the sea and feeder canals pierce the dyke in places to admit sea water and boats. In some places reclamation is in progress and cotton is grown on the desalinized lands. (See pp. 63, 182.) There is a wide frontier region between land and sea, and in most of the area, navigation for all save local craft is made difficult by the very extensive sandbanks and mudbanks. The Great Yangtze bank has depths of less than 20 fm. and stretches for at least 125 miles from the estuary. Those farther north extend for as much as sixty miles from the coast, but they are not accurately surveyed, and ships with a draught of 24 ft. or less usually proceed from a point outside the Yangtze in a north-north-west direction avoiding these dangers altogether. Near the old mouth of the Hwang ho there are extensive banks on which junks ground at times; the most notable of these is the Ta sha, or Great sands (Plate 18).

Haichow wan is shallow but surrounded by a number of hills. It belongs to the Shantung area in physical features, but has no good natural harbour. Haichow, a town of about 11,000 people, is twelve miles from the mouth of the Linhung ho: it has lost its former position as a port owing to the silting of the river. There are wharves at Tapu, eight miles from the river mouth. Haichow and Tapu are on the Lunghai railway, which terminates at the artificial port of Laoyao. This lies between the mainland and an island, and consists of two parallel wharves with a breakwater, and there are depths of 16-18 ft. in the harbour.

*Communications.*—No roads reach the coast between the Yangtze delta and Haichow wan. The Lunghai railway runs from Laoyao to Haichow, Suchow aud Kaifêng, where it is linked with the Hankow-Peiping line and various lines in the north-west. A road follows a course similar to the railway, but no information about its condition is available.

## 15. THE COASTS OF SHANTUNG (Figs. 53, 54)

Most of the coasts of Shantung are exposed to heavy winds, and the anchorages are relatively few and generally of indifferent quality. The alluvial lowlands are fronted by shallow bays and backed by hills which in places reach the coast as headlands. Tsingtao, the main port of the province, lies at the south end of the lowland

corridor which lies between the eastern and western hill masses forming the Shantung Uplands.

*Haichow wan to Kiaochow wan (Figs. 51, 53)*

The coast between Haichow wan and Kiaochow wan consists of various headlands and shallow bays with a few islands. It marks the seaward end of the western mass of the Shantung uplands, and its exposed bays are unattractive to navigation. The Acrona inlet has an anchorage for small ships.

Kiaochow wan has a deep entrance one mile wide, and extensive anchorage is available in the south of the bay near Tsingtao. The outer part of the bay has a hilly coast with deep water, but the low-land shores of the inner bay are fronted by extensive mudflats which dry out to as much as three miles off-shore. Some junks travel up the small rivers leading into the bay. A narrow and intricate junk channel, the Ku ho, leads to Kiaochow, which was formerly the trading centre for the whole area. Tsingtao, a town of 515,000 people, is of great strategic and economic significance. The port may be frozen over between December and March, and there are many fishing stakes in the harbour (Plate 102).

*Kiaochow wan to South Cape (Fig. 53)*

The rugged coast to the east of Kiaochow wan has one good anchorage in Laoshan harbour which is 3-5 fm. deep in the entrance. Laoshan wan, to the east of Cape Yutan, is wide and open with several islands in the outer part and sandbanks near the shores. There is good shelter from north-east winds at the extreme south-east of Great bay in depth of 5 fm., but the coast is very exposed in summer to varied, and at times very strong, easterly winds. The coast between Cape Adkins and South head is generally unapproachable owing to rocks and shoals, with several islands and reefs. There is an anchorage in depths of 2-3 $\frac{3}{4}$  fm., sheltered from south-west winds, between Sanpin chuang and Che tao.

The Tingtsi kiang has an estuary mainly occupied by mudflats; for nearly twenty miles east-north-east from the Tingtsi kiang the coast is low, sandy and broken in places by rocky ledges. This area, which is closely settled and intensively cultivated, is diversified by hills, and difficult to approach from the sea. The Tahoe inlet has a least depth of 2 fm. in the entrance leading into 3-5 fm. of water. The head of the inlet consists of sandbanks.

Pohwang tan is a particularly exposed bay with a steep rocky shore near Tautsui head, and a low muddy shore leading to a lagoon which is generally dry at low water. Sandy areas alternating with cliffs form the coast between Tautsui head and Goose point and there are extensive cultivated plains. Wuleitao wan (Mudflat bay) practically dries throughout and is as unattractive for navigation as many areas along this coast. Chinghai wan is shallow and its low shores are indented by drying creeks. The coast between Chinghai wan and South cape is alternately low and cliffed.

*South Cape to North-East Promontory (Figs. 53, 54)*

There are several bays along this coast with cultivated lowlands between hills. Anchorages are of particular significance owing to exposure to the prevailing north winds of winter and south winds of summer. Wongkio bay and Shihtao wan have facilities for anchorage especially against north winds, in depths of  $2-3\frac{1}{2}$  fm. There are anchorage depths of 8-10 fm. outside Shihtao wan. Mui tao, an island which forms the south-west corner of Shantung peninsula, is low and partly cultivated. There is anchorage for large ships during north and north-west winds off the south-west of Mui tao, in depths of 6 fm. There are sandy shores between Mui tao and Pingyeng kiao and an anchorage north of Ears rock has depths of 4-8 fm. Sankow wan is open to the east, and the only protected anchorage from east winds is near Pingyeng kiao under the shelter of reefs; the greater part of the bay gives suitable anchorage for small ships with other winds. The shores are steep at the extreme north and south of the bay, but elsewhere consist mainly of sand or low cliffs. Aylen bay has depths of 6-8 fm. in the entrance, decreasing gradually to the head of the bay. It is divided into two parts by a rocky headland, Middle point, on either side of which there is fair anchorage with north-east winds.

The coast between Aylen bay and Mashan to has some small bays, of which Litao wan and Yangyuchih wan have anchorage for small ships. Yungching wan is both larger and more useful for shipping. It has a sandy coast with lagoons and gives shelter with winds between south-west and north-east through north, in depths of 4-7 fm. Ships bound for the Gulf of Pohai meeting north-west winds shelter in this bay until the storm is abated. Yungching wan is bounded on the north by the Shantung promontory, the extreme north-west point of the peninsula, which consists of a number of sharp peaked hills from 300 to 1,000 ft. high. It terminates in



Plate 101. The Yangtze and the Bund, Hankow  
The river is at its low winter level.



Plate 102 Tsingtao, Shantung  
This photograph shows the beach and town facing Tsingtao wan.





Plate 103. North-east promontory, Shantung peninsula.



Plate 104. Narcissus bay, Weihaiwei, Shantung

The hills of the Eastern Upland of Shantung reach the coast in a series of headlands around Weihaiwei bay. Landing beaches and the anchorages near Mato are seen.

North-east promontory, a rugged broken cliff. There are many wrecks in this locality as fog is frequent and a dangerous tide-race runs half a mile offshore. In the Shantung promontory, Malan cove is a convenient anchorage for small vessels during south and east winds in depths of 5 fm. (Plate 103).

*North-East Promontory to Chefoo (Fig. 54)*

This coast consists mainly of sandy bays with a few headlands. There are very few anchorages, but Weihaiwei and Chefoo have harbours of some significance. West of the North-east promontory a sandy beach stretches for eleven miles, with a lagoon almost dry at low water, broken at Chauyang point. There is some hilly country with rocky shores immediately to the east of Weihaiwei.

Weihaiwei anchorage lies in a bay entered between Chaopei tsui and Peishan point five-and-a-half miles to the north-west. The island of Liukung tao separates the eastern entrance from the western. The eastern entrance has a minimum depth of 18 ft., and is navigable by ships of 16 ft. draught at any state of the tide; the western entrance is deep in the fairway. The bay is extensive and the shores mainly sandy with a limited extent of lowland, beyond which ranges of hills are mainly barren rock or planted with dwarf pine and scrub oak. Weihaiwei itself is a walled town a short distance inland, and at Mato there is a stone pier available for steamships at any state of the tide. Various anchorages are available in the bay. Though significant in the trade of Shantung, Weihaiwei is not without its disadvantages. North winds set in with the arrival of the winter monsoon about September, and anchorage becomes difficult in the western entrance. Winds east of either south or north drive a strong swell into the eastern entrance at various times (Plate 104).

The country to the west of Weihaiwei is hilly with very small areas of lowland and has sandy beaches in very exposed bays which are of little use for navigation, apart from fishing junks. Putohan has good anchorage in the east side of the bay with offshore winds, but a heavy swell sets in with north and north-west winds. West of Yaoyao tsui the coast as far as Chefoo harbour consists of sandy beaches backed by a low flat sandy plain, broken only by a few hills. There are inlets which become partially or completely dry at low water. One hilly island, Yangma tao, separates Lungmeen harbour from the sea, but this, too, is largely dry at low water. Junk traffic alone is usual along this stretch of coast.

Chefoo harbour lies in a bay partly sheltered from east winds by islands. The outer anchorage is open to north and north-west winds in autumn and winter. Small ships anchor in Village bay and the inner harbour is safe, large, and dredged to 20-25 ft. The town of Chefoo has 132,000 inhabitants.

*Communications.*—The communications of Shantung are centred upon the three significant ports. Tsingtao is connected by rail with Tsinan, the capital of the province, and thence to Tientsin and Peiping. No railways reach Weihaiwei and Chefoo. There is a road, recently reported to be in fair condition during dry weather, from Kiaochow to Chefoo and a road from Chefoo to Weihaiwei is said to be suitable for motor traffic during dry weather. Other roads exist in the peninsula, but it is doubtful whether they can carry more than the local cart traffic.

#### 16. THE GULF OF POHAI (Fig. 55)

The gulf is entered by the Pohai strait, which lies between Shantung and Kwantung, and is over fifty miles wide. The Miao tao group of islands and rocks stretches for thirty-five miles from Tengchow head. Between these very dispersed islands which have several anchorages there are a number of deep and safe channels. There is an anchorage near Tengchow head, suitable for use with local knowledge, but without protection from the north. A second anchorage to the south-west of South Chang shan has depths of 4-5 fm. Hope sound anchorage is available only in summer as it has no shelter from the strong north winds of winter. The Tanruan anchorage, which lies to the north-west of Chang shan, is available at all seasons. A sheltered anchorage to the south of Toki tao may be used with local knowledge.

The Gulf of Pohai has depths of 10-15 fm. in the area west of the Pohai strait, but there are shoals for several miles off the south-west shores. Navigation is hindered, but not entirely prevented, in winter by ice formation, generally from the middle of November to the end of March. During November there are snowfalls and severe frosts, with north and north-east gales. Thin ice which forms rapidly on the extensive mudflats is carried by flood tides into the rivers, which are frozen by the middle of December. About this time the ice becomes compact and fills up the head of the Gulf of Pohai within a line drawn south-south-west from Shalui tien banks. The area includes the approach to Taku, the port for Tientsin. Ice

breakers of the Hai ho Conservancy Board are in use and it is generally possible to keep the river open as far as Tientsin in December and February, and even in January during a normal winter (Plate 109).

*Tengchow Head to the Hwang ho (Figs. 54, 55)*

The coast has a south-westerly trend from Tengchow head to Laichow wan. The coast is hilly to Devonport point and low and sandy between Devonport point and Chimatao promontory, which is a small range of hills connected with the mainland by a sandy isthmus. Lungkow wan, on the south side, has an anchorage in depths of 6-10 ft., but only ships with a draught of less than 9 ft. can enter the harbour. A former treaty port, it serves the town of Hwanghsien.

West of Lungkow the coast is the margin of a low cultivated plain, densely populated and backed by high hills. Laichow wan forms the south part of the gulf, and extends from the Laichow bank to the Siaoching ho. The west part of this bay is filled with shoal, and there are depths of from only 1 fm. up to as much as five miles offshore. Several rivers flow into the bay, but they can only be approached by small craft at high water. Yangkiokow is a port for Tsinan, the capital of Shantung, with which it is connected by a canal.

*The Hwang ho to the Shalui tien banks (Fig. 55)*

The mouth of the Hwang ho is most unattractive to shipping, though the river is extensively used for local traffic by small craft. The steady growth of shoals is carrying the coastline farther out into the gulf; the gain of the land against the sea might be retarded by the control of floods and the less spectacular phenomenon of soil erosion, or by the change in the course of the river to a position south of the Shantung peninsula. Between the Takow ho and the Chi ho there is a sandy coast with some dunes: the coast between the mouth of the Chi ho and the Hai ho consists of sand and mud.

No port has arisen in the relation to the Hwang ho which Shanghai bears to the Yangtze or Hong Kong to the Si kiang. However, Tientsin on the Hai ho with its outports, Taku and Tongku, stands second among the ports of China Proper. The Taku bar lies about nine miles off the entrance to the river, and vessels awaiting high tide to enter the river use it as an anchorage. The depth of the Hai ho is varied owing to the disastrous silting

in years of heavy floods, but the Conservancy Board endeavour to maintain such a depth that ships with a draught of 13 ft. can reach Tientsin at average high water (see p. 61). The population of Tientsin is 1,292,000. The Pehtang ho flows out to the sea through drying mudflats about seven miles north of the Hai ho. There is a shallow bar outside the river and an open anchorage about ten miles off the entrance to the river,  $3\frac{1}{2}$  fm. deep. The river has a depth of  $3\frac{1}{2}$  fm. (Plates 12, 14).

The coastal areas consist of cultivated areas and extensive barren plains which are largely swampy and sometimes completely flooded, with saline alluvium as the main soil type (see p. 181). The coast between the mouth of the Pehtang and the entrance to the Chiang ho is fronted by a mudbank, which dries out for one and a half miles. East of this river the Shalui tien banks extend for nearly forty miles, and stretch from seven to ten miles from the coast. The passages between the various banks are used by small junks.

*Communications.*—The plain around the Hwang ho is devoid of railways and motor roads. Water lanes here are supplemented by footpaths. There are roads from Tientsin to Taku, Peiping and other centres, but little is known of their present condition. The railway connections are much more significant as they are linked with the North China railways and the reasonably adequate Manchurian system. The line from Tongku to Tientsin is connected with lines to Peiping and also with Central China. The line to Manchuria runs from Tongku to Pehtang and on to Chingwangtao and Mukden.

#### 17. THE GULF OF LIAOTUNG (Fig. 55)

Only part of the shores of this gulf lie within China Proper. Desolate coasts of sand and mud lie to the west of Shali chiao, which is the southern end of a line of dunes extending for twenty miles. At Rocky point the hill ranges of North China are within a few kilometres of the coast, and the landscape consists of cultivated lowlands backed by hills. Peitaiho anchorage lies to the south of Rocky point and is 5 fm. deep. Shallow bay lies between Rocky point and Chingwangtao, and has a good anchorage. The shore of sand and shingle is sufficiently steep to enable boats to land easily. Chingwangtao harbour has accommodation for ships with draughts of 21–26 ft. and can be entered at any state of the tide.

The coast along the remaining nine miles to the Manchurian border has a steeply shelving beach suitable for landing. A culti-

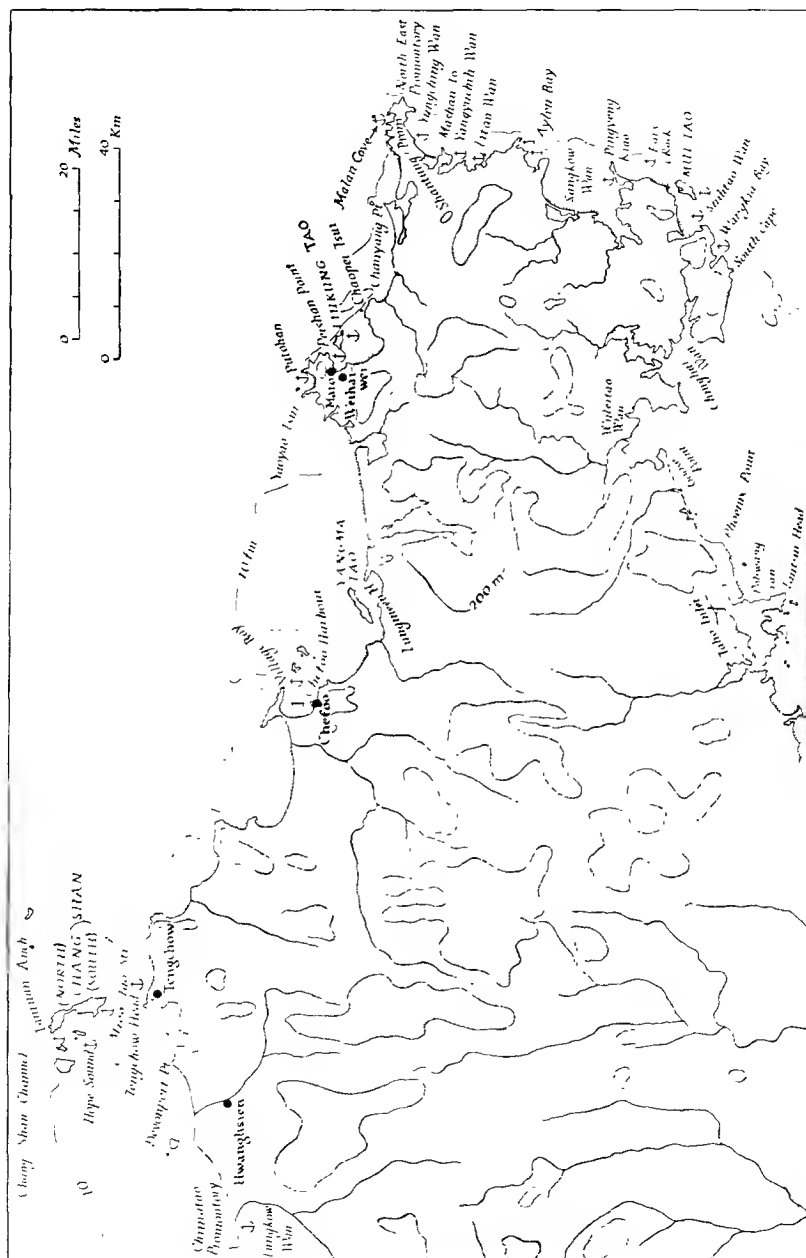


Fig. 54. The coasts of the Shantung Peninsula

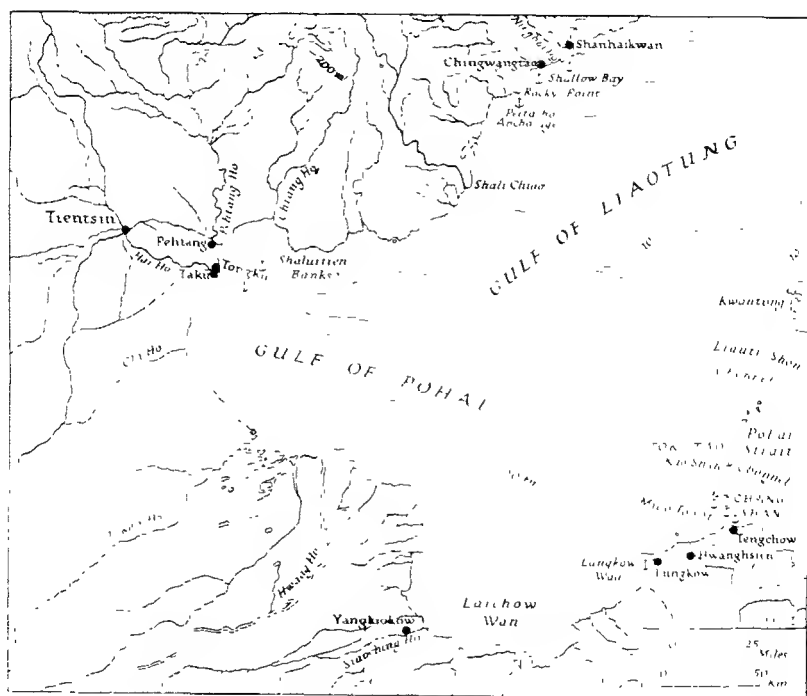


Fig. 55. The Gulf of Pohai and the Gulf of Liaotung

vated lowland extends a few miles inland to the foot of the mountains which rise to over 2,000 ft. Almost parallel with the Great Wall, the actual frontier at the coast is the Ninghai kiang, off which there is a good anchorage with offshore winds in a depth of 4 fm. with good holding ground of thick mud.

*Communications.*—The coastal lowland between the hills and the sea borders the Gulf of Liaotung and carries the road and railway from China Proper into Manchuria. Both are of immense strategic importance and human significance as they are the routes by which millions of Chinese entered Manchuria as immigrants. The road is apparently of reasonable quality. The railway, completed by 1907, runs from Peiping to Tientsin and Shanhaikwan, where it enters Manchuria. Apart from the branch line to Taku, mentioned above, there are branches to Peitaiho and Chingwangtao. The latter port has a position of vital significance and great potential power. Here, as elsewhere in China, trade is drawn to a port from relatively distant regions owing to the inhospitable character of coasts fronting relatively rich areas.

#### BIBLIOGRAPHICAL NOTE

1. Detailed descriptions of the coasts and the coastal waters are provided in the following British Admiralty publications—*China Sea Pilot*, vols. i and iii (London, 1937); *Yangtze Kiang Pilot* (London, 1928); together with the appropriate *Supplements*.

2. A certain amount of additional material is contained in the following *Sailing Directions* of the United States Hydrographic Office—No. 124 *Asiatic Pilot*, vol. iii (Washington, 1942); No. 125 *Western Shores of the China Sea* (Washington, 1937); together with the relevant *Supplements*.

3. Information on the coasts and their immediate hinterlands is contained in many of the works and articles cited in the Bibliographical Notes to Chapters II–V.



## Chapter VII

### SOILS AND SOIL EROSION

The Nature of a Soil : The Soils of North China : The Soils of Central and South China : Soil Erosion : Bibliographical Note

#### THE NATURE OF A SOIL

A soil changes and develops from age to age. The soils of China have been tilled for hundreds and even thousands of years, and they are the ultimate wealth of the whole population. They are influenced by erosion (see p. 192), deposition by rivers and streams, climate and weather, and above all by agriculture and forestry. There are few areas of virgin soil in a country so long settled as China, and an acute soil problem exists. Men may destroy, by unwise cropping or disafforestation, the resource on which all life depends.

Soils are derived from rocks and organic matter in varying proportions. The rock is the parent material; it may consist of anything from a tough granite to a wind-blown sand. In China, alluvium, deposited by the flood waters of rivers, is a widespread parent material. Organic matter is derived from the decaying vegetable matter which is left in the soil, and interacts with it to form various chemical compounds. This interaction is most clearly seen near the surface where the organic material is most abundant. Seen in section, most soils exhibit a kind of layering, and it is usual to distinguish three layers or horizons. Of these the A or upper horizon is most fully charged with organic matter, the C or lower horizon is nearest in structure to the parent rock, and the B or middle horizon occupies an intermediate position (Figs. 59, 60).

The arrangement of a soil in these three horizons depends largely upon the climate. Rainwater percolates into the soil and may carry soluble material downwards, impoverishing the surface layers but depositing its load in the B (middle) or C (lower) horizons. This process is known as leaching and is common in areas of heavy rainfall, such as South China. In regions of light rainfall the water percolates into the soil, but is drawn back to the surface by evaporation under the sun and wind. The long dry periods of North China provide such conditions. Both processes occur in most areas, but

one is normally predominant. If soluble materials, such as lime, are brought upwards to the surface, the soil will have an alkaline reaction. It will be acid if such materials are carried down by leaching from the A horizon.

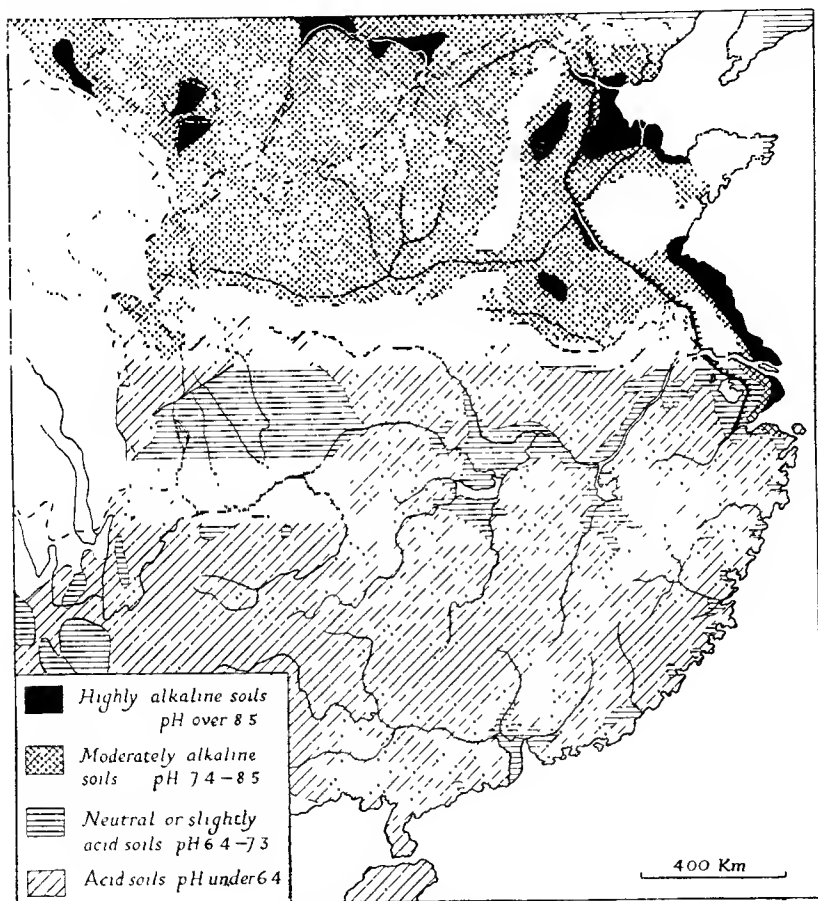


Fig. 56. Acid and alkaline soils

Based on (i) Thorp, J., *Geography of the Soils of China*, p. 417 (Nanking, 1936), and (ii) Buck, J. L., *Land Utilization in China: Atlas*, p. 33 (Nanking, 1937).

Alkalinity of the soil is most marked in the drier areas of North China, with some areas of saline alluvium near the coasts of Kiangsu and of the Hwang delta; acid soils are most fully developed under conditions of heavy rainfall, such as prevail in South China, especially in mountainous areas.

The relative alkalinity or acidity of a soil is assessed by pH values. The chemical basis of these need not concern us here. A pH of 7

indicates neutrality; over 7 indicates alkalinity; and under 7 indicates acidity. There are in North China small areas with highly alkaline soils and considerable areas of moderately alkaline soils. Acid soils are typical of South China; the intermediate type, of neutral or slightly acid soils, is found in upland areas of North China and in various alluvial lowlands in Central and South China (Fig. 56).

### THE SOILS OF NORTH CHINA (Fig. 57)

#### *Black Earths*

The famous black earth steppe-land soils occur in small areas near the border between China Proper and Inner Mongolia, and on the fringe of Tibet. These areas are covered by a tall grass-steppe vegetation, and have very dark brown to black soils from 8 in. down to 3 ft. in depth. The textures vary from a sandy loam to a loamy clay, and the A horizon owes its dark colour, as in all chernozems, to the presence of considerable quantities of organic material. The B horizon, which is frequently called the BCa horizon to denote the presence of calcium, consists of yellowish brown to light brown material, streaked and mottled by accumulations of silty or concretionary lime, or both. These soils are similar to those widely developed in Manchuria, and are not typical of North China.

#### *Loess Soils*

The distribution of loess has already been discussed (see p. 64). There is a close coincidence between the north-west limit of the loess and the course of the Great Wall through the Ordos loop. Between the Wall and the Hwang ho there are sand dunes and areas of grey or yellow-grey desert soils. These are highly calcareous owing to the arid climate and high evaporation.

The loess soils fall into two groups. Within the uplands of North China they consist mainly of chestnut earths: in the North China Plain they are chiefly alluvial. Some loess deposits in the uplands have developed their own soil profiles which are exposed in the characteristic vertical cliffs. The general texture is a silty clay loam or silty clay. In places, however, there are horizons with striking accumulations of lime in concretions which are cemented masses of this soil material. Some of these lime-charged horizons lie directly under bands of reddish-brown clay. These are respectively the old BCa, and A horizons of a former surface soil. Many of the deeper loess deposits contain a large number of superimposed

profiles, indicating sporadic accumulation. Loess, by its very nature as a soil frequently renewed by outblowing monsoon winds from the interior of Asia, has maintained and developed its fertility through the centuries.

### *Chestnut Earths*

The chestnut earths are nowhere well developed in China Proper, but are widespread in Manchuria. Imperfect types, however, occur widely in the upland area of North China. The pure type occurs where soil moisture is less than in the black earths, and it is characterized by a mixed short and tall grass vegetation. A typical dark chestnut earth has from 8 to 36 in. of dark brown soil, varying in texture from sandy loam to clay loam, and forming the A horizon. Beneath the dark-coloured A horizon is a second horizon of considerably varying thickness containing a high percentage of lime, either as a soft or silty deposit, or gathered in hard concretions. In the highland area of North China, chestnut earths have been kept in a young or imperfectly developed stage by constant erosion and deposition. There is no well-developed accumulation of lime in the profile; yet all the material is calcareous from the surface downward, except where there are buried soils leached free of lime when formerly exposed at the surface. In some cases the subsoil has a higher percentage of lime than the surface: in others, slightly leached soils are covered with a thin layer of material more calcareous than the original surface soil, and deposited by wind and water.

Soils may differ markedly owing to local conditions of exposure. In upland areas of North China the richer soils and vegetation are on the north-facing slopes, the exact reverse of conditions in the British Isles. In the semi-arid climate of North China, the high evaporation caused by the sun's rays is more pronounced on the south-facing slopes. These have light coloured and imperfectly developed chestnut earths and are generally barren. The soils on the north-facing slopes are dark chestnut earths and black earths. Here the vegetation is richer and cultivation may be possible (see p. 263).

### *Shantung Brownsoils*

Shantung brownsoils occur: (1) on the rolling hills and rough mountains of Shantung; (2) in a belt on the eastern fringe of the North China plateaux; and (3) in a smaller area in north-west

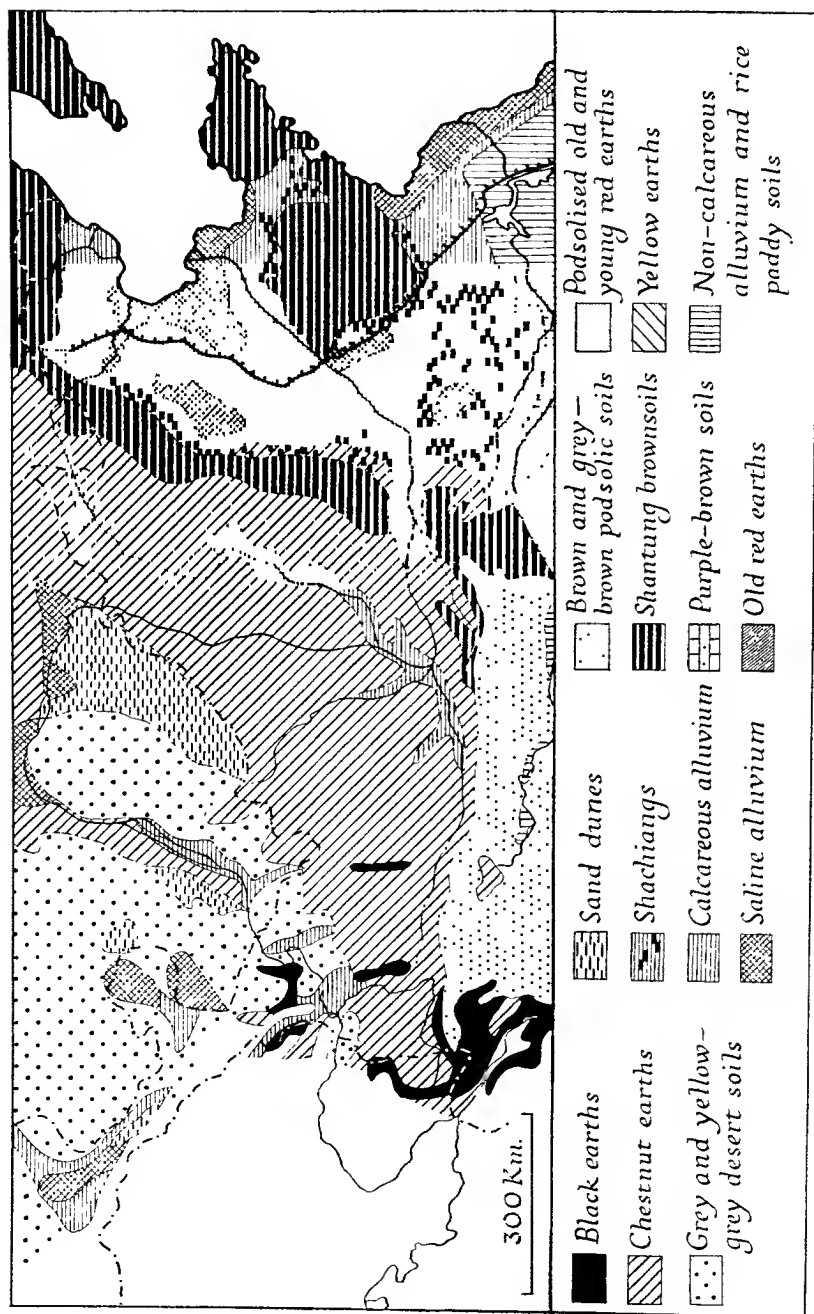


Fig. 57. The soils of North China

Based on Thorp, J., *Geography of the Soils of China*, folding map (Nanking, 1936).

The greater part of the lowlands is covered by calcareous and saline alluvium; to the north-west occur the various soils developed under arid and semi-arid conditions.

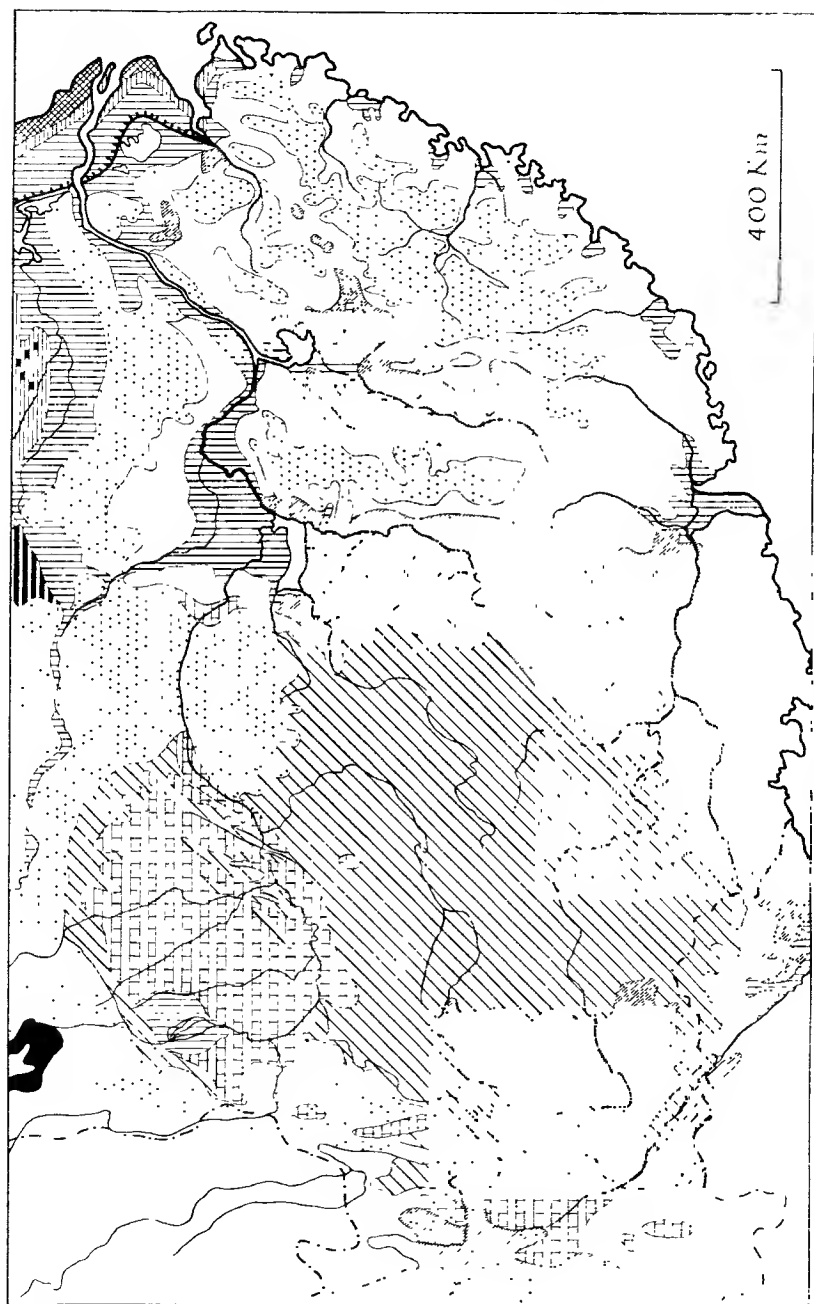


Fig. 58. The soils of South China

Based on Thorp, J., *Geography of the Soils of China*, folding map (Nanking, 1936). Alluvium and rice paddy soils are well developed in cultivated lowlands. The purple brown soils of Szechwan derive their colour from the underlying rocks. On the highlands are found various types of acid podsolized soils, many of low fertility.

Honan. The well-developed Shantung brownsoils are slightly to moderately leached and have perceptible A, B, and C horizons. Those derived from granites and gneisses, and other acidic rocks, have an A horizon of a grey-brown heavy loam, passing down into a B horizon of stiff, loamy clay, with small black concretions due to leaching. The organic content is low and the reaction generally only slightly acid. In soils derived from alluvial fan and terrace materials, the B horizon may be more strongly developed and consists of a very stiff non-porous clay amounting to a claypan, with small black concretions. A claypan is a hard clay-horizon so stiff that it is stone-like when dry. The Shantung brownsoils derived from shales and sandstones weather into loamy clays, with a heavier clay present in the B horizon and some development of concretions. Many of the soils listed as Shantung brownsoils are only slightly formed with vaguely defined horizons. In Shantung and Hopeh those derived from limestones have a bright brown or reddish brown surface with a reddish brown subsoil lying at a shallow depth on the parent limestone rocks.

In the valleys and along the hillfoot there are various alluvial deposits derived from the erosion of the Shantung brownsoils. Some are silty clay loams, brown in colour; others, especially in the neighbourhood of limestones, are red clays. Generally these soils are thin and almost devoid of profile development. There are fixed sand dunes near the mountains in western Hopeh and northern Shantung. These dunes are usually less than 30 ft. high. Under cultivation, erosion exposes the unconsolidated lower strata and the rejuvenated dunes begin to move once more.

Some of the Shantung brownsoils are recalcified, due to the addition of calcareous dust. This accumulates rapidly in the northern part of the mountainous region of west Shantung, which receives the full blast of the north-west winter monsoon. In the lower Hwang ho region it may be due to the exposure of the surface for cultivation; before agriculture was practised, this plain was a series of marshes with grass and brush-covered areas from which it would be difficult for the wind to collect much dust.

### *Shachiangs*

In the North China Plain *shachiang* soils rarely appear at the surface, being almost entirely covered by alluvium and re-deposited loess. These soils derive their name from the lime concretions which sometimes resemble ginger roots, giving the name 'rock

ginger' or 'ginger stones'. Horizons of *shachiang* soils are at various depths, sometimes within 1 ft. of the surface and sometimes as much as 6 ft. below it. The lime accumulation may be in the form of concretions which are small, irregular and rounded, like the ginger roots noted above; others are longer and fantastically shaped. Hardpans of cemented and solid layers of limestone as much as 20 in. thick may develop. There may also be associated round, black iron-manganese concretions. Some of the lime comes from the A horizon immediately above, and other sources are the calcareous alluvium, shales, loess and limestones through which the water has passed before reaching the low-lying areas where *shachiang* soils are found. The zone of lime accumulation is the fluctuating water table in the soil. These soils occur most abundantly in low-lying places where the water stands on the surface of the soil for several months each year and is evaporated during the dry season. They are widely distributed in northern Anhwei, north of the Hwai ho, in central and west Shantung, and at the junction of the alluvial fans and recent alluvial deposits of the Hwang ho plain in northern Honan and western Hopeh.

Two main types of *shachiang* soils are distinguished: (1) the lakeland type, and (2) the upland type. The lakeland type occurs in flat-bottomed depressions in the northern parts of Kiangsu, Anhwei and Honan, with some areas in Shantung. These soils, which are clays or clay loams at the surface, become sticky and intractable in wet weather and very hard and dry during droughts. They are of limited value because they are usually flooded during the summer months. The upland type occurs on slight elevations, in some cases only 3 ft. higher than the areas of lakeland *shachiang*. In the dry season the water table of the *shachiang* soils is only 6 to 9 ft. below the surface and farmers frequently dig wells to reach the water supply or pump the water directly from drainage ditches. The lakeland soils may be used only for wheat and barley, sown in autumn, after the summer flood waters have receded, and harvested before the summer rains. The upland *shachiang* soils may be used for crops even during the rainy season and are planted with wheat and various other crops.

*Shachiang* soils are on the very sites where they are most likely to be covered by other deposits, as where alluvial fans, bordering the highlands of Shantung, join the river plains. Some recent deposits exceed 12 ft. in depth and soils which were at the surface a few thousand or even a few hundred years ago are now buried 6 to 9 ft.



below the surface. North of the Hwang ho in northern Honan and south-west Hopeh, old fans, on which *shachiang* soils occur, have been dissected and the thick accumulations of *shachiangs* and limestone hardpans are left capping the hills. They are covered by loess in some places, but in others form a hard surface crust.

### *Alluvium*

The great diversity of the deposited soils of the North China Plain is due to the many changes in the courses of the Hwang ho and the vagaries of its flood waters, which may alter the character of the soil in a single season. During the flood of 1935 in west Shantung some of the deposits left behind by the river exceeded 6 ft. in thickness. Some farmers who formerly had poor sandy soils and who could scarcely make a living, now have rich and productive clayey soils to farm, while others whose lands were silty and rich must now struggle with unproductive sandy types. Every type of deposit from sand to clay is found and soil sections frequently show very varied strata of sands, silts and clays, especially near to the larger rivers.

*Calcareous Alluvium.*—The term calcareous alluvium covers a multitude of soil types, varying in texture, colour, and amount of calcareous material. The most important of these types is the silty alluvium, of fairly uniform texture from the surface to the subsoil, which covers more than half the plain in Hopeh, Shantung, north Honan and north Kiangsu, and which is also the dominant type on the valley lands of Shansi, Shensi and Kansu. This alluvium is chiefly a light yellowish or greyish brown colour on the surface and very porous, granular and mostly yellowish brown in the subsoil. Most of these soils are markedly calcareous and of considerable fertility except locally where they are impregnated by soluble salts. In heavily fertilized places, such as those around the cities, the surface soils are dark coloured and very rich. In the smaller valleys of north-west China, calcareous alluvium is frequently of a pinkish brown or light reddish-brown colour; many of the alluvial fans receive a mixture of clays and loess from the hills. Soils of this naturally mixed type are more productive than those composed entirely of re-worked loess.

Clayey types of calcareous alluvium usually occur in low-lying areas far back from the rivers. Intermittent lakes may develop in these hollows and the soils are grey or dark grey in colour. A large proportion are too saline or alkaline to be used for agricultural

purposes. They occur most widely in west and south Shantung and in north Kiangsu, with smaller areas in narrow strips in Honan, Hopeh and Shansi.

Sandy calcareous alluvium occurs along the past and present courses of the Hwang ho and its various tributaries and distributaries. With the overflowing of the rivers, sandy materials are dropped close to the river bank. Sandy loams are heavy enough to hold their position well, but lighter types of loamy sands and sands are attacked by wind and blown into dunes. These may migrate across good farmlands, and important areas in North China have been ruined by sand. At Kaifêng the city has been buried several times under sand dunes and fresh alluvial deposits (Fig. 63).

*Non-calcareous alluvium* is found in sandy and loamy deposits washed out from the non-calcareous soils of hills in Shantung and Hopeh, with small areas in northern Honan and along the northern edge of the Tsinling shan in the Hwai valley. These soils are varied in type. Some are light, yellow-brown or light reddish brown in colour with little profile development except for a slight accumulation of greyish organic matter in the surface horizons. Some soils washed from reddish clay have a reddish tint and heavy texture. Those washed from granites and sandstones, as in Shantung, consist largely of fine gravelly loams, sandy loams and loamy sands.

*Saline Alluvium.*—Areas of saline alluvium occur in various parts of the North China Plain and in coastal regions along the Gulf of Pohai north of Shantung and especially in Kiangsu, between Shantung and the Yangtze delta. Surface soils may become markedly saline even if the subsoil water contains only a low percentage of salts, owing to the more or less constant capillary movement of water to the surface under conditions of high evaporation during the day, especially during the windy dry season in China. Saline soils vary in texture from silty loams to heavy clays. The possibilities of reclamation and cultivation depend largely upon the height of the water table. Where the water table is within 5 ft. of the surface during the dry season, capillary action brings the subsoil water to the surface, where it is evaporated and the salts are left to accumulate as a crust. With a lower water table, the upper parts of the soils contain a smaller proportion of salts. Reclamation is easier towards the south under conditions of heavier rainfall, as frequent rains dissolve the salts and carry them downwards in the soil: moreover, the humid atmosphere checks evaporation. Drainage ditches and canals are constructed to keep the water table as low as possible.

Near the sea coast in Kiangsu tidal gates are built in the ditches to permit water to flow outward from the land during low tide but to prevent ocean water from penetrating the land during high tide. Unfortunately, the gates so far constructed must be operated by hand and they are frequently left closed during the dry season. Automatic tidal gates are cheap and easy to construct and will open to let the water out of the ditches as soon as the tide goes out : when the tide returns the pressure of water will automatically close them.

It has been estimated that in eastern Kiangsu 2,750,000 people could be supported if a well-planned drainage system could be established and kept in running order. There are at present considerable areas of reclaimed saline soils in east Kiangsu used for cotton, sometimes rotated with such winter crops as wheat, broad beans, barley and clover. Unreclaimed areas have a vegetation of salt-tolerant plants used for household fuel and salt manufacture, or of reeds used for sunshades, awnings and matting.

#### THE SOILS OF CENTRAL AND SOUTH CHINA (Figs. 57, 58)

The soils of this vast area are subject to various degrees of leaching. In the main they are soils on uplands which are covered with trees or coarse grass. These upland soils suffer from heavy erosion and their materials are carried down to replenish the soils of the river flood plains, which are usually non-calcareous alluvium. Another type, the rice paddy podsollic soil, has developed on the hillsides terraced for rice cultivation.

The upland soils have had certain materials removed by leaching from the upper horizons to be deposited in the lower horizons. They are known as podsoles and are divided into types on a basis of colour. The main groups are : (1) the brown and grey-brown podsollic soils ; (2) the purple-brown soils, (3) various types of red and yellow earths.

##### *Brown and Grey-brown Podsollic Soils*

The area covered by these soils is extensive and probably one-third of all the soils of China south of the Tsinling shan and the Hwai valley fall into this group. The degree of podsolization is varied and, as previously noted, some soils are only slightly acid, especially in the Central Mountain Belt (Fig. 56). These soils were formerly mainly forested, but are now covered with coarse grass

and limited areas of cultivation. A widespread type has a well-developed grey-brown or dark grey A horizon and a yellowish-grey or whitish B horizon, with the incipient development of yellowish brown, brown or slightly reddish brown B horizons. The parent materials are varied and these soils are generally very shallow medium to light loams and clay loams. Darker coloured mountain soils also occur, generally with a humid vegetation of grasses, shrubs and low trees, probably replacing forest. The soils are black, dark grey or dark brown: the sombre colour is due to the accumulation of organic matter from the decay of dead grass leaves and roots, or from the residue of burnt grass. The natural fertility of these soils lasts for only a few years, but they respond readily to fertilization. Most of the well-developed soils are planted to rice and are therefore altered, but others are used for upland crops, such as wheat, barley, buckwheat and beans. Areas less well-developed or severely eroded are used for forestry or fuel grass production.

Some of the grey and grey-brown podsollic soils are known as claypans from their very heavy and compact B and C horizons. They occur on low hills from Honan to south Kiangsu and are also found along the river Yangtze, especially around Pukow, Nanking, Chuyang and Chinkiang. They have been recognized as far up the river as the Tungting hu, but their extent decreases steadily from Nanking. The parent material is a wind-blown clay, the Piashu formation which may have been derived from the plains of the Hwai, Han, Yangtze, and the Tungting and Poyang lake-basins. These soils are admirably adapted for rice culture; the heavy clay parent material makes excellent storage basins for water and the rolling hills of the claypan region are studded with innumerable small ponds. There are some areas of double cropping in which the fields are so terraced that they may be drained in winter and flooded for rice in summer. Most of the hilltops were formerly cultivated but they have lost their surface soils by erosion and have become valueless.

### *Purple-brown Soils*

These are found in the Szechwan Basin, where a very large proportion of the rocks are purplish sandstones and shales. The name 'Red Basin' comes from the small proportion of reddish soils, but 'Purple Basin' would be more apt, since it would recognize the very important difference between the rich purple-brown soils of Szechwan and the highly leached and infertile red soils of south

and south-west China. The purple-brown soils are varied in type, as they are derived from shales and sandstones of many shades of colour and considerable variation in hardness and chemical content. Many of the shales and sandstones are more or less calcareous and some layers contain fairly large percentages of soft lime and hard lime concretions, resembling *shachiangs*, with other layers completely free from lime.

North of Chêngtu there are many very young and imperfectly developed purple and purple-brown soils which are moderately to strongly calcareous. These have developed from thinly stratified shales and sandstones with a high percentage of finely divided loam ; they are kept too young by rapid erosion to be exposed to leaching. Purple-brown soils derived from very sandy rocks have a stronger profile development, and have surface soils of sandy loam or loam texture, grey brown in colour with a moderately acid reaction. The subsoils vary from light reddish purple to yellow-brown, with a clay loam or loamy clay texture. The soils are seldom very sandy, because the sandstones contain various minerals which weather into clays.

The character of the purple-brown soils depends very largely upon the varied relief features of Szechwan. In some areas erosion has removed the whole soil, leaving only bare shale or sandstone at the surface. In others the soils are thin, imperfectly developed and left as forest land. The productivity of Szechwan is largely due to the irrigated areas in terraces on the hill slopes. These are planted mainly with rice, but on level or gently sloping land various upland crops are grown, such as maize, wheat, sweet potatoes, beans and tobacco. Outside Szechwan, purple-brown soils occur scattered throughout China, including Yunnan, where some are used for upland crops, with rice in the valleys.

### *Red and Yellow Earths*

This group is widespread in Central and South China. It consists of sub-tropical soils, exposed to various degrees of leaching and related to laterites, which in their typical form are white, red and buff coloured clays, possessing a network of coarse streaks of different colours in the soil, commonly called ' reticulate mottling '. The soil, if exposed to the air, develops into a hard, gravelly crust. Climate is apparently the dominant factor. Red and yellow earths occur in China almost entirely in regions having a rainfall of more than 40 in., with a temperature in the coolest month of more than 40° F. and in

the hottest of over 82° F. Frost lasts for only a short time in winter and is unknown in south Kwangtung, Kwangsi and Yunnan. Snowfalls are common during the winter months in the northern part of the region where these red and yellow soils occur, but snow does not remain long on the ground.

Humidity appears to be the most important of the various climatic elements involved. The average annual relative humidity is over 75% in the red earth region, and over 90% in the yellow earth region (Fig. 86). The Kweichow plateau and parts of western Kwangsi have the highest humidity in the country except for a few mountain peaks, and here yellow soils reach their chief development (Fig. 58). Within this region, red earths occur only where the drainage is good. In Yunnan, on the other hand, where there is a well-marked dry season and the average humidity is much lower than in Kweichow, red soils are developed on a large scale. The red and yellow earths include three main types of soils, which are indicated in Fig. 58 and will now be considered.

*Old Red Earths.*—These soils have been derived from a parent material of a lateritic nature, in which leaching has removed much of the alkaline materials and silica, leaving a clay relatively low in silica and high in iron or alumina or both. Erosion has at various times removed the existing A horizon and sometimes also parts of the B horizon, and new A horizons have formed on the truncated profiles. Some of these podsolized red soils of South China, especially those on flat and gently sloping areas in Kwangtung and Kwangsi, contain hardpans. The ironstone occurs in thin plates in concretions or in an irregular band of varying thickness in the deeper layers of the soil. Many of these soils are formed under conditions of imperfect drainage, due in some cases to the presence of heavy clay in the parent material. In Kiangsi there are many areas of clay soil with hardpans on gently sloping or level hills. On the upper slopes, erosion has removed much of the soil and left blocks of hard ironpan exposed on the surface. Some of the old red earths, slightly podsolized or unpodsolized, are more or less truncated profiles of podsollic red earths.

The old red earths have been subjected to heavy erosion and about one-half are practically useless. Most of these soils are very poor in plant foods, so that trees and cultivated plants are not easily established on soils after the natural cover has been removed and the small amounts of available plant foods exhausted by cultivation or erosion. Heavy fertilization may maintain cultivation for years in

places ; in Hunan and Kwangsi, some soils are reclaimed by the use of pond mud laboriously carried up the valleys and added to the red soil areas, together with light soil and oil cake fertilizers. Burnt animal bones are sometimes added to remedy the general phosphate deficiency.

*Podsolized old and young Red Earths.*—These red earths are distinguished from the group discussed above by their more complete podsolization. They have lighter textured surface soils, but a heavy clay in the lower horizons. Agriculturally they are of greater value and many podsolized old red earths are used for growing tea, as in Chekiang, south Anhwei, Kwangsi and Hunan. The menace of erosion is acutely felt and many areas are ruined after a few years of cultivation.

Young red earths are widely distributed in South China and are especially abundant on the steeper slopes of the hills of old red earths, and in mountainous regions where old red earths are rare. There soils are podsollic in various degrees, but the profile development is less advanced than the old red earths and, as fewer elements of soil fertility are leached away, they are agriculturally more valuable than the old red earths. There is a strip of mountainous land near the sea coast from Kwangtung to Chekiang where young podsollic red earths cover most of the hills and mountains, in association with grey-brown podsollic soils. These soils have been terraced for the cultivation of sweet potatoes and are therefore known as the 'sweet potato' soils. If these soils cannot be irrigated and planted to rice, they are sometimes used for wheat, maize, beans and other crops. In the northern part of this range, tea and tea oil are among the important crops and tung-oil trees are extensively planted in some regions. In mountainous regions many soils are planted to coniferous forests (especially *Cunninghamia*) and bamboo.

*Yellow Earths.*—These soils are derived from the same kinds of materials as the red earths with which they are sometimes closely associated, but the lower horizons are yellow. Their properties result largely from a damp condition in the soil, due either to a continually moist climate or to inadequate drainage. In the old red earth region of South China, yellow earths occur only in flat or slightly depressed areas which are not actually waterlogged but have imperfect drainage. On the Kweichow plateau and the mountains surrounding the Szechwan Basin, yellow earths are widely developed in areas of varied relief. Here the rainfall is high and the relative humidity more than 90% (Fig. 86). The soils in the yellow earth

region of Kweichow and west Kwangsi rarely become thoroughly dry, whereas the old red earths farther east are dried out frequently.

The younger yellow earths are very widely distributed in humid mountainous regions surrounding the Szechwan Basin and occur intermittently in all provinces south of the Yangtze. They are strongly acid and most of them have distinctly podsolized profiles except where erosion is active. The older yellow earths occur chiefly in the continuously moist regions of Kweichow and west Kwangsi. From small vestiges of these soils it is evident that they formerly had well-developed  $A_1$  and  $A_2$  horizons, but these are largely lost by erosion. It is doubtful if more than 5% of the yellow earths are cultivated if those planted to rice and converted to podsolized paddy soils are excluded. They are used for tea and tea-oil in Kweichow and considerable areas are forested, but large areas are barren or covered with grass.

### *Alluvium and Rice Paddy Soils*

*Alluvium.*—The material eroded from the various upland regions in South China has been accumulated as alluvium in the valleys and basins of the rivers. A line drawn just north of the Hwai river in an east-west direction approximately separates the calcareous alluvium of the North China Plain from the largely non-calcareous alluvium of Central and South China. A fairly continuous band of calcareous alluvium skirts the sea coast as far south as Chekiang and very small strips occur along the Yangtze and other rivers of the south. These are too small in area to appear on the generalized maps given in this chapter. The alluvium of South China is deposited under flood conditions. Sand and silt occur near the river-bed and the finer silts and clays are carried to the lowlands beyond the natural levées.

The type of alluvium is varied. Near the mouth of the Yangtze, especially near Shanghai, there are large areas of more or less sandy and silty soils, of which some are greyish brown and some pinkish-brown in colour. The profile development is slight, with only a meagre accumulation of clay in some of the older deposits, and some grey and rust mottlings in the deeper horizons where drainage is imperfect. Some soils have a few small lime concretions, which are either derived from upper horizons or from shell molluscs.

Most of the rivers of the red soil region are clear except immediately following heavy rains, since practically all the valleys are



artificially terraced for rice cultivation and only the heavier rains wash soil materials into the rivers. Erosion is also checked in the forested areas and deposits in the valleys are accumulated by the rolling of granular material down the slopes. In the areas of granitic mountains there is sandy alluvium, as in Kiangsi and Hunan, especially along the Kan kiang. In Kiangsi, these are scraped off in places by the farmers to uncover clayey and silty soils suitable for rice culture. In Szechwan, fresh alluvial deposits consist of sandy deposits in narrow strips along the rivers, except on the Chêngtu Plain, where there is a gradual accumulation of silts, clays and sands from irrigation waters brought in by canals from the Min kiang. Many of the rivers in Kwangtung and Kwangsi are sufficiently entrenched to have only narrow flood plains.

Sandy and loamy types of recent alluvium are used for wheat, rape, beans and, near the cities, vegetable crops. The actual river-bed is used in many parts of South China, as there are very considerable changes of level between the wet and dry seasons. During the low water period a steeply sloping bed of silty and sandy materials is exposed below high-water mark on which the farmers plant winter crops, such as wheat, rape and broad beans, which are harvested before the summer rise of the river.

*Rice Paddy Soils.*—Soils planted to rice acquire new characteristics and may be classified as rice paddy soils. These differ in type according to the areas in which they are developed and the materials from which they are derived. Most of the paddy soils derived from alluvium and lacustrine deposits are periodically moist; even if the water table disappears completely from the upper layers during the dry season, the subsoil remains moist. Many alluvial deposits are interstratified, with alternating coarse and fine textured materials.

The porous layers are rapidly bleached if there is an outlet for the water. A bleached horizon is one in which the colour is lighter than the others in the profile. If the water does not fill the porous horizons iron is usually precipitated above the average water level in concretions or as hardpan. The profiles on alluvial and lake plains are very complicated, for it is not uncommon to find three or more bleached horizons and as many in which iron is accumulating or segregating. In other cases, the soils are recalcified by the addition of burnt lime or pond muds containing finely divided fragments of molluscs, especially snails and mussels.

Combinations of acid soils and an abundance of limestone are very common in South China, especially in Kwangsi, Kweichow and Yunnan.

In the very numerous narrow valleys of Central and South China there is little apparent difference after a time between the rice paddy soils at the bottom of the valleys and on the hillsides. There is, however, always a difference between soils which are permanently wet and those which are drained of their moisture during the dry season. A bluish 'gley' horizon characterizes the deep subsoils in flat waterlogged valleys, but this is absent in subsoils of the paddy fields or the hillsides where water drains away in the dry season. The character of the paddy soils of small valleys largely depends on the nature of the soils of neighbouring hills. Those from red earths are very poor and it takes many years of intensive cultivation and fertilization to improve them. Those from grey-brown and brown podsollic soils and from purple-brown soils are much more productive. Those from claypans are generally similar to those of grey-brown podsollic origin, but with a stiff clay B horizon. Some of this last group have enough silty material washed from surrounding hills to make them a little lighter textured and more friable.

The unpodsolized and slightly podsollic rice paddy soils are mostly dark in colour and some are almost black. They occur chiefly on the flood plains of the larger rivers and lakes from Szechwan eastwards to the China sea and south-eastwards along the sea coast on the deltas of various small rivers. The Chêngtu Plain soils, which belong to this group, are being continually renewed by silt deposits. Dark-coloured paddy soils are of great importance in the Yangtze valley and the Hwai, where they blend into the 'lake-land *shachiang*' soils of north Anhwei.

The strongly acid soils of the small valleys and hills are much less productive of rice and wheat than the richer soils of the larger valleys and flood plains. In parts of Fukien, Kwangtung and Kwangsi, farmers harvest two crops of rice each year, and in some places a third small crop is obtained by interplanting.

The two profiles included here show something of the complexity of individual soils (Figs. 59 and 60). In each case, the whole history has to be taken into account to explain adequately the characteristics of a particular soil. This is especially true of those areas of deposition, by wind and water, which cover the major agricultural regions of China.

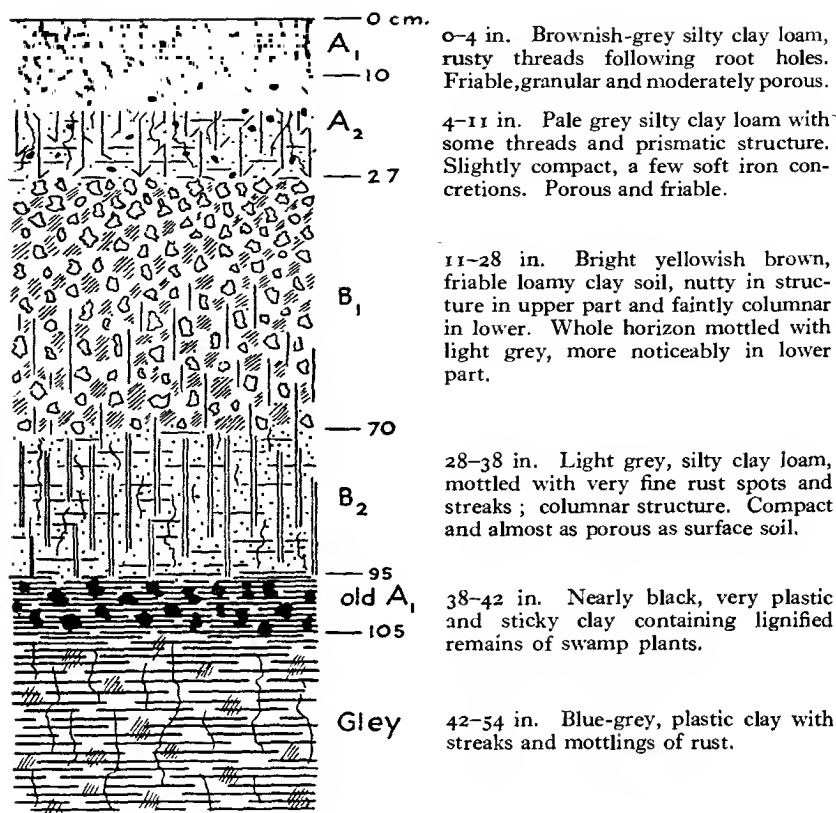


Fig. 59. Rice paddy soil, Wukang, Chekiang

Based on Thorp, J., *Geography of the Soils of China*, p. 375 (Nanking, 1936).

The two upper horizons are a typical rice paddy soil derived from materials washed down from neighbouring hills and spread over a swamp. The swamp is represented by the two lower horizons, which contain organic matter and a 'gley'. Gley is a blue-grey (sometimes blue) material owing its properties to poor drainage and characteristic of swamps, bogs and some rice paddies.

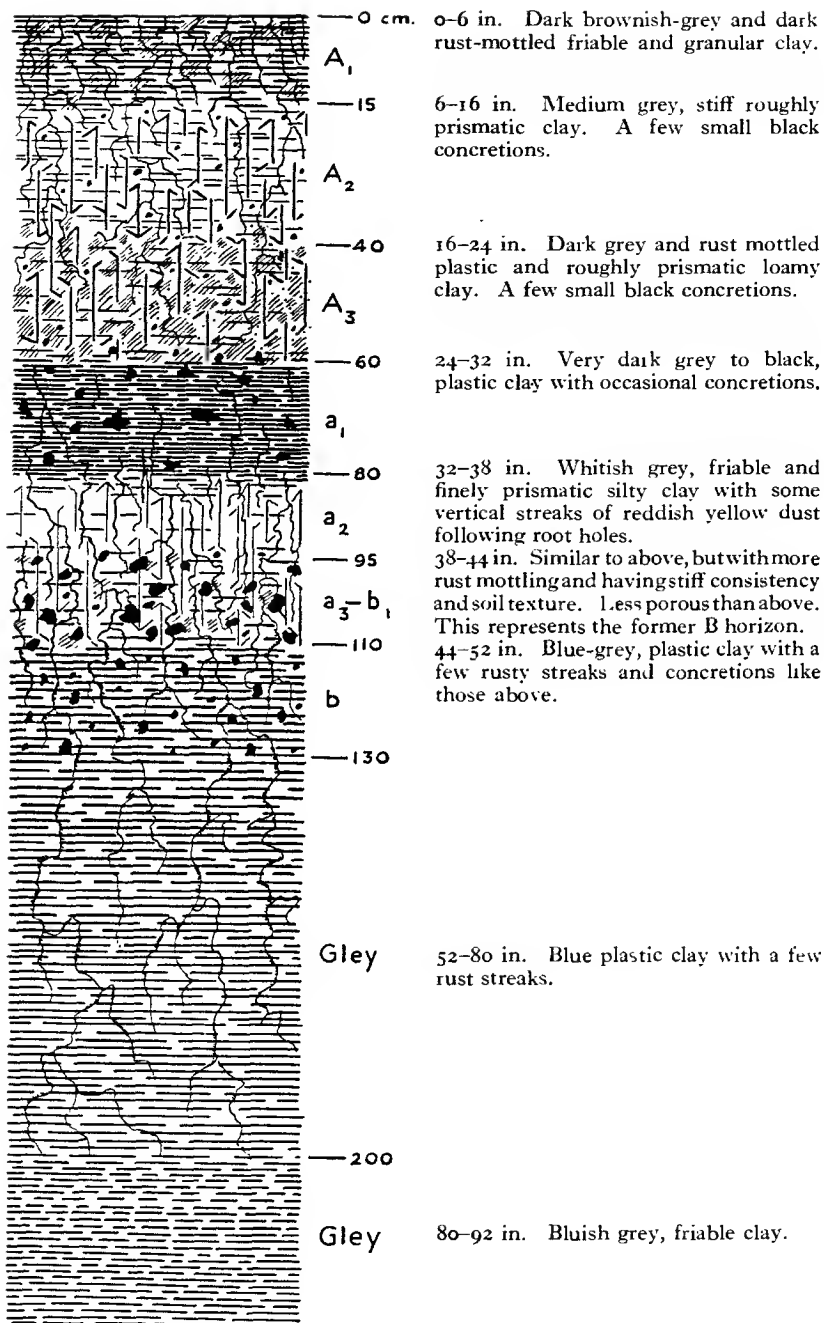


Fig. 60. Rice paddy soil, Soochow, Kiangsu

Based on Thorp, J., *Geography of the Soils of China*, p. 393 (Nanking, 1936).

This soil has a double profile, A<sub>1</sub>-A<sub>3</sub> over a<sub>1</sub>-b, developed on gley. The upper part rests on a former soil typical of those developed in the lake region of the Yangtze delta.

## SOIL EROSION

*General Features*

Many of the most fertile soils of China are in alluvial lowlands renewed by river deposition and flooding at intervals. The gain in these areas is due to the loss of valuable soil in mountain valleys and hundreds of acres of land in the interior must be ruined in order that one acre of soil may be produced at the sea coast. This process is more active in North China, partly because the vegetation cover is less dense than in the south. A critical stage is reached when the topsoil is removed and streams begin to erode the underlying deposits. The incidence of soil erosion in any area depends upon a number of factors which operate in varying degrees. The soil type and relief, the state of the vegetation, natural or altered, the quantity and incidence of rainfall in relation to evaporation, agricultural activities, including irrigation and terracing, are all of significance in various ways. One factor among those listed may be most vital in any selected region, but usually a number of factors operate together.

*Types of Soil Erosion (Fig. 61)*

Several types of erosion are found in various parts of China. Sheet erosion consists of the removal by rain-water of a thin layer of soil, either after the removal of forest or by the creation of small gullies and rills in a very fine network over cultivated fields. This process, so insidious because it is observed only with difficulty, results in the gradual removal of the topsoil. It is more obvious on sloping surfaces, but occurs also on level land. Gully and gorge erosion attacks certain areas with particular force, especially in the loesslands of the north, but it is found throughout China in disafforested areas. Sink-hole erosion is typical of the loesslands, especially in the thicker deposits. Deep cracks develop during dry weather and water from the summer rains works its way down until it strikes an impermeable layer. In time an underground line of drainage is marked by a series of sink-holes in the surface. This may be a preliminary stage in the development of a gully (Fig. 62 and Plates 105, 107).

Soil creep and landslides also occur. Every time a farmer hoes the land, or pulls a weed, the soil is pushed a little farther down the hill. Landslides due to thawing are most common in the loesslands of north and north-west China, where the occurrence of loess

cliffs and gorges makes landslide development easy. There are few landslides in South China, but normal soil creep is of significance. Wind erosion in the desert and semi-desert areas of north-west

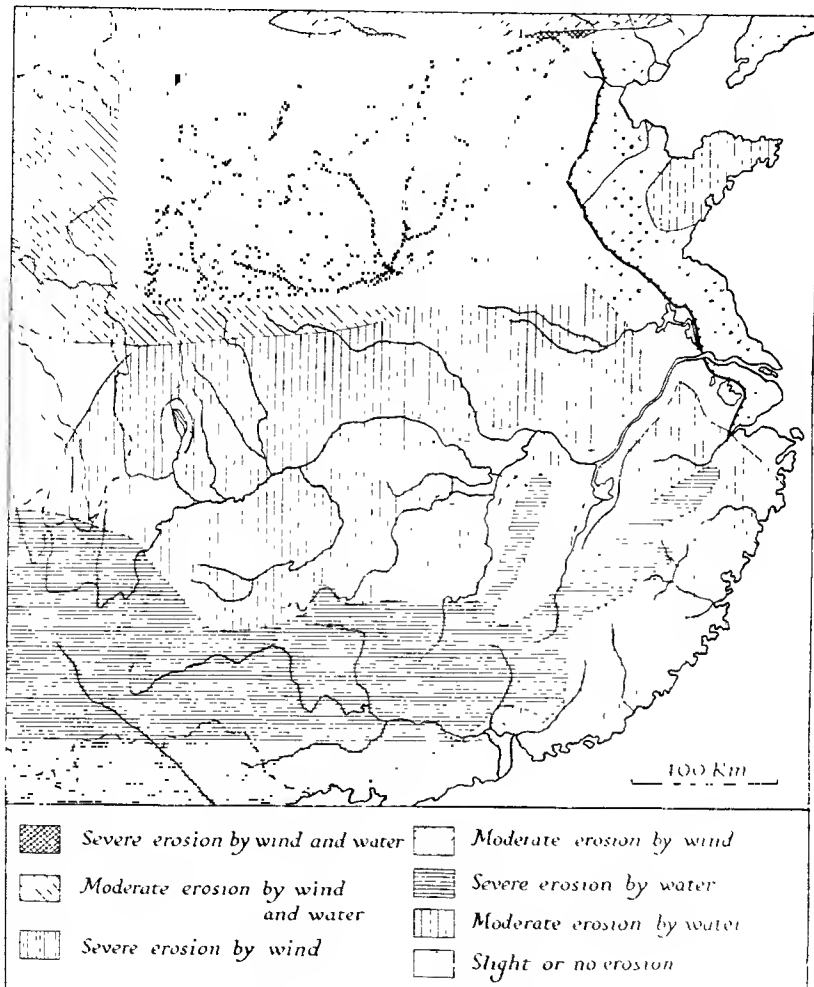


Fig. 61. Types of soil erosion

Based on Tieh, T. Min, 'Soil Erosion in China', *Geographical Review*, vol. xxxi, p. 575 (New York, 1941).

Erosion, both by wind and water, is severe in the uplands of North China. In South China erosion by water is a menace in many disafforested areas: the alluvial lowlands are generally areas of deposition, though there are occasional dust storms in the North China Plain.

China and Inner Mongolia has provided the loessal deposits which fill the mountain valleys, such as those of the Wei and the Fên. Sandy areas cultivated near the Great Wall in Shensi and Ninghsia are beginning to furnish a new supply of dust and have been seriously affected by wind erosion within recent times. This newly-formed desert is slowly but relentlessly moving south-eastwards over the land. Dunes, formed by the erosion of sands by

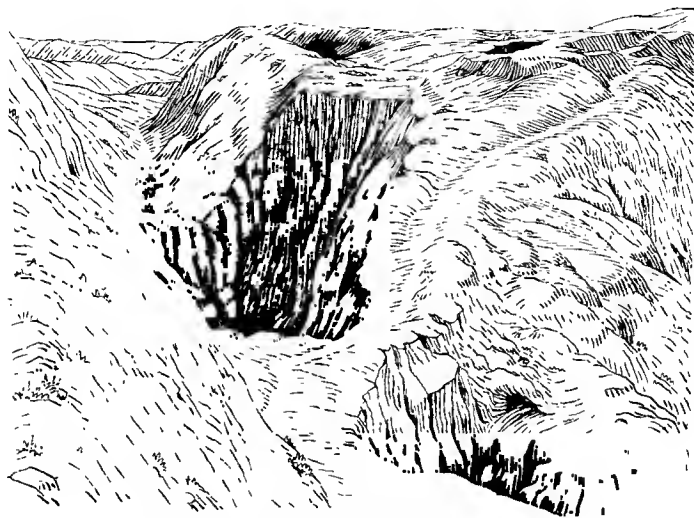


Fig. 62. Sink hole in loess, Kansu

Based on a photograph in Thorp, J., *Geography of the Soils of China*, p. 445 (Nanking, 1936).

Sink holes may be as much as 50-60 ft. deep and are often a preliminary to gully formation.

wind, may form a serious menace in the North China Plain (Fig. 63).

### *Control and Incidence of Soil Erosion*

The farmers of China have long been aware of the dangers of soil erosion. Their efforts to check this menace are linked with water-control, which is the basis of agricultural development throughout China. In the loess region of the north-west, canal irrigation is necessary to spread the waters over the thirsty soils : in the lower Hwang ho and Hwai, flood control is necessary ; in the

Yangtze kiang and the Si kiang valleys, water-control involves the continuous drainage of fertile but swampy alluvial land and the maintenance of a complicated system of drainage and irrigation, which has been practised since at least the eighth century B.C. The canals, built either by the peasants or by government enterprise, have had the dual purposes of preventing floods and maintaining fertility by applying the silt-laden waters where they are most needed. Terracing of slopes maintains the productivity of steep hillsides which might otherwise be swept bare of their soils. None the less, the Hwang ho has a silt content of 14% to 22% by



Fig. 63. Sand dune climbing over a city wall, Hopeh

Based on a photograph in Tieh, T. Min, 'Soil Erosion in China', *Geographical Review*, vol. xxxi, p. 582 (New York, 1941).

Wind erosion removes the fertile topsoil of ploughed fields and piles it into useless dunes.

weight in times of flood and every season thousands of tons of productive soil layer are carried down from the mountains. This is due to the steepness of many slopes, and the rapid disafforestation in certain regions. It has been estimated that in the Taiyuan region of the Fên ho valley, only 10% of the slopes are terraced (Fig. 64).

The map showing the types of erosion in China (Fig. 61) must be regarded as tentative but it brings out certain major points. In the lowlands of China erosion is virtually absent and deposition of new soil materials frequently alters their agricultural possibilities (see p. 180). In North China, erosion by wind is severe in the arid



areas, from which loessal material is carried by the outblowing winds of winter.

Within the loesslands of the semi-arid area, wind erosion is still marked. Cultivated areas are necessarily left bare for part of the year and strong winds sweep away loose particles from the fields, especially in winter. Added to this is the menace of water erosion in various forms. On the margins of this area of very heavy erosion, wind and water operate rather less sharply.

The soils of Shantung and a large part of South China are subject to moderate erosion by water. This varies from place to place, according to the incidence of various factors, including especially the presence or absence of forest cover, and the system of agriculture. Erosion by water is particularly severe over a large part of South China, owing to a combination of heavy rainfall, disafforestation and unwise agricultural experiments. This is especially the case in the areas of yellow soils. The general picture explains to some extent the limited possibilities of settlement in South China; it also suggests that much irrevocable harm has been done.

### *North China*

The farmers in north-west China have probably done more erosion control work than any other people in the world. It is unlikely, however, that complete control of the erosion of the loessland of north-west China will ever be accomplished. Sheet erosion is the first stage in the destructive process. On the loesslands sheet erosion is widespread and catastrophic, especially where steep slopes have been recklessly cleared of forest for a quick profit. The soil is washed downward in thin sheets and small gullies; the farmers erect obstacles of sod or earth at regular intervals on the slope to check erosion. In east Kansu, there are many farms on the higher hills where terraces are just being constructed. On the older farms of the lower hills, terraces have been developed through many centuries (Plate 106). Sheet erosion is also active on the Shantung brownsoils of the hills in Shantung and west Hopeh and in some areas gully erosion has carried the sinister process farther. Intensive erosion may ruin rich alluvial lowlands by the deposition of sand and gravel. Terracing is fairly general in the region of the Shantung brownsoils, where it is usually easy for the farmers to find rocks suitable for terrace walls. Reafforestation is desirable over much of this region as a means of controlling run-off waters and preventing floods.



Plate 105. Erosion in loess near Antung, Kansu

A major gully and its tributaries are actively eroding the loess; incipient gullies are seen on the steep slope and sink holes in the right foreground. An endeavour to check erosion by terracing is evident.



Plate 106. Terraces in loess near Lanchow, Kansu

Careful terracing has restricted the ravages of erosion, though some gullying is apparent on the left. Sheep tracks are seen in the centre foreground in front of the walled village.

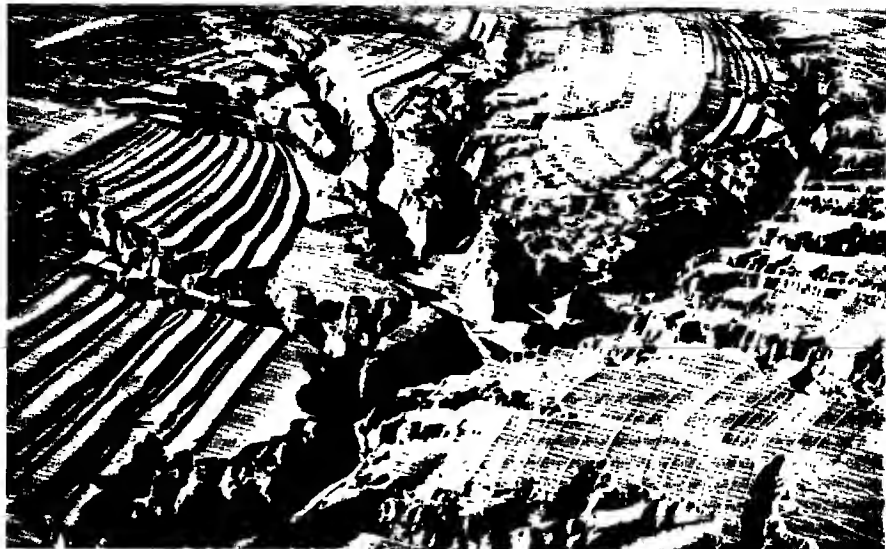


Plate 107. Gullies in loess, Shensi

Deep gullies are steadily encroaching the loess deposits despite intensive terracing

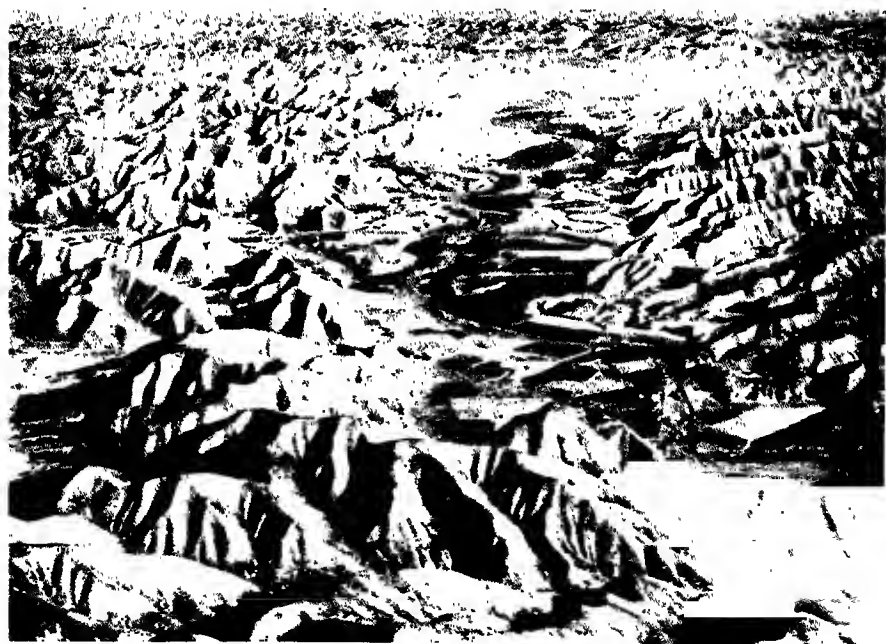


Plate 108. Residual loess hills, Kansu

Long continued erosion by gullying has produced a 'badland' topography of barren treeless hills : cultivation is limited to the valley floor.

Gully erosion on a considerable scale is attacking the loesslands of north-west China, especially where the deposits are deep. Vertical walled gullies form in any place where the vegetation is removed or where people or animals have worn paths into the soil. The upper layers are quickly saturated by heavy downpours of rain but the lower layers often remain dry during the same period. There is a rapid run-off during the heavy rains of summer and the water follows any track or other depression. During dry weather cart wheels and hooves of animals cut the loess into very fine dust which is washed away by the first rain. Gullies also work their way



Fig. 64. Terraces in loess, near Taiyuan, Shansi

Based on a photograph in Sion, J., *Géographie Universelle*, tome ix (*Asie des Moussons*), première partie, facing p. 78 (Paris, 1928).

Part of the area shown is terraced, but heavily eroded country with the characteristic loess cliffs can be seen.

upward from the valleys through the cultivated fields, especially along the lines of drainage arranged by farmers to remove surplus water from their terraces. Gullies may also form along the cracks and fissures which develop at the edge of loess cliffs. In some cases farmers establish fields in the floors of these gullies, but the process, when once begun, gathers strength from year to year (Fig. 65).

Sink-hole erosion is, as noted above, merely a preliminary to gully erosion, and a further source of destruction is the occurrence of landslides, some of which are caused by earthquakes in east Kansu. The columnar structure of the loess makes a break only too easy, especially where a gully has already developed (Plate 105).

The control of gully, gorge and sink-hole erosion is very difficult owing to the friable nature of the loess and the torrential nature of the summer rains: walls of water 3 to 6 ft. high may come dashing down the gullies. The construction of effective dams would require a great expense of labour and materials under some unified governmental control. There is very little timber available locally, but some gravel and cobble stones which occur under the loess might be used for dam construction. There is little hope of afforestation on an

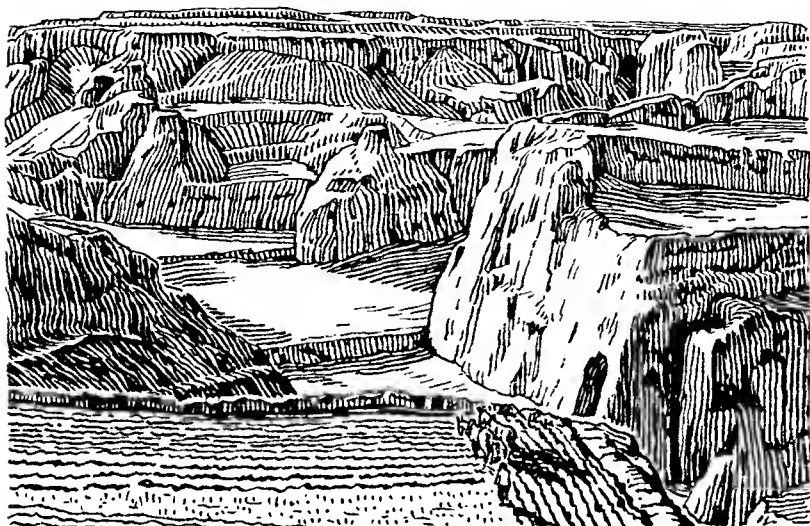


Fig. 65. Loess gorge

Based on a photograph in Tieh, T. Min, 'Soil Erosion in China', *Geographical Review*, vol. xxxi, p. 582 (New York, 1941).

The loess gorge has sides which are almost vertical, and generally unstable. The area is of very limited agricultural value, but a few fields are seen in the valley and above the cliff walls. Fantastic forms include a wall of loess and a natural amphitheatre.

extensive scale. Native grasses and bushes, where undisturbed, form a good cover, but they are all cut back every year and often dug up by the roots to supply fuel. It is largely the annual destruction of vegetation, the intensive cultivation of the good lands and the open grazing of the non-agricultural lands that are responsible for the severe erosion of the loesslands and the heavy silt burden of the Hwang ho and its tributaries (Fig. 66 and Plate 108).

*Central and South China*

In Central and South China, terracing has been the main means of restricting soil erosion, but upland crops are grown on unirrigated land near the ricefields. These crops are usually planted in rows up and down the hill and the soils are eroded so rapidly that the farmers often abandon the land after two or three years of cultivation. Sheet erosion is widespread on the claypan soils of the lower Yangtze valley, in Anhwei and Kiangsu, and in some cases gullies have



Fig. 66. Loess hills, Kansu

Based on a photograph in Tieh, T. Min, 'Soil Erosion in China', *Geographical Review*, vol. xxxi, p. 582 (New York, 1941).

The hills are sharply eroded and treeless. A few terraces are seen at the hill foot (left centre), while the valley is used for sheep pasture.

developed. This is very largely due to the planting in furrows up and down hills above terraces.

In Szechwan, considerable areas of soils on purple shales and sandstones are planted to rice in terraces and are therefore practically free from serious erosion. Here, too, upland crops, such as sweet potatoes and maize, are planted up and down hills; therefore sheet and gully erosion is encouraged. In some parts of Szechwan, the surface slope corresponds to the tilt of smooth sandstone rocks. The original soils were very shallow, probably not more than 20 in. in thickness, and when such lands were originally cleaned and cultivated, the sandy soils were removed by sheet erosion so that large areas of rock are now completely bare. Some farmers have collected

the remaining soil into terraces, forming small islands of fertility in bare sandstone regions. In these areas, sheet erosion is already too advanced for afforestation to be practicable, but the more dangerous stage of gully erosion is rarely reached in Szechwan, as the inhabitants have a very practical appreciation of the value of the soil.

Sheet erosion is very active on the red and yellow soils, especially the former. It is responsible for the removal of a large area of friable and medium-textured surface soils in South China, and the exposure of the heavy, red granular subsoils to gully erosion, which completes the destruction begun by sheet wash. Sheet erosion continues to be dominant on the rounded hilltops and gentle slopes of the red soil



Fig. 67. Gully erosion, Hunan

Based on a photograph in Tieh, T. Min, 'Soil Erosion in China', *Geographical Review*, vol. xxxi, p. 582 (New York, 1941).

Gullies are formed on the disafforested uplands of Hunan, turning this area of red soils into a 'badland' similar to those developed in the western United States.

region, while gullies have attacked steep slopes and cut their way back into terraces and rolling uplands (Fig. 67). Practically all the red and yellow soils of South China were formerly covered by a surface horizon of yellowish or light greyish-brown material well adapted to forest growth. With this removed, it is difficult to establish young forests (Figs. 68, 69).

These soils may, if not too severely eroded, be reclaimed by planting crops such as tea on terraces. Some legumes have been used to restore fertility and fix nitrogen in the soil in various parts of India and the Far East. 'Sunn hemp' (*Crotalaria juncea*) grows well on the poor red soils of India and Burma, and is already cultivated in parts of South China. Its seeds are a useful source of food and the

stems produce a valuable fibre. The legume known as ' ipil-ipil ' (*Leucea glauca*) in the Philippines, is growing wild in various parts of Kwangtung. It grows rapidly and in three or four years develops

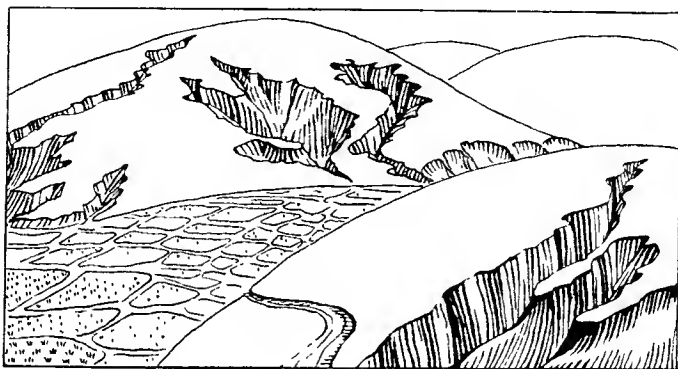


Fig. 68. Gully erosion in red earths

Based on Thorp, J., *Geography of the Soils of China*, p. 459 (Nanking, 1936).

These gullies are in an early stage of development on old red earths, with ricefields in valleys near Yungning, Kwangsi. Sheet erosion further contributes to the destruction of the slopes.

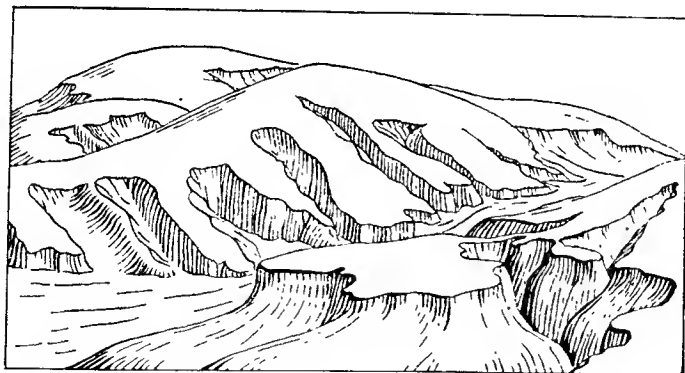


Fig. 69. Gully erosion, advanced type

Based on Thorp, J., *Geography of the Soils of China*, p. 461 (Nanking, 1936).

This shows a more advanced stage of gullying in an area near that shown in Fig. 68, but higher up the valley where the process is much more rapid.

into a good-sized tree which makes excellent fuel. There are various other legumes growing wild in South China which could be used for reclaiming eroded soils. The bamboo is also very effective in holding



the soil. It produces matted fibrous roots which, when well established, almost completely stop soil erosion. In Central and South China, bamboo could be used most effectively in strip forestry, alternating with pines and firs (especially *Cunninghamia*). Many mountain dwellers in the south derive their main livelihood from forest products, but because of the low income provided by lumbering, they are obliged to grow their own food as far as possible, even at the expense of ruined soils.

Control of gully erosion is easier in the humid regions of South China than in the drier regions of North China. However, many gullies in the deep red soils of South China have advanced too far for reclamation now. Gully dams may be established in the red and yellow soil region more easily than in the loess region. The deeper horizons of the clays are more or less impenetrable to water and therefore dams are much less likely to be washed away. If terracing is not possible on the hillsides, the re-establishment of forests on a large scale would add considerably to the resources of South China. In many parts of South China, forest, brush and grass lands of the hills are burned off annually by local farmers and young trees cannot grow successfully. On many of the impoverished red and yellow soils trees are finally replaced by tall coarse grasses and tall ferns which effectively check soil erosion. None the less, vast areas have already been wasted and the problem of effective land utilization will present itself with increasing force in the future.

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1. The most systematic survey of soils and soil erosion in China is Thorp, J., *Geography of the Soils of China* (Nanking, 1936); a more general treatment by the same author is found in Buck, J. L., *Land Utilization in China*, pp. 131-61 (Nanking, 1937).

2. Amongst the many papers on the subject the more important include: Barbour, G. B., 'The Loess Problem of China', *Geological Magazine*, vol. lxxvii, pp. 458-75 (London, 1930), and 'Recent Observations on the Loess of North China', *Geographical Journal*, vol. lxxvi, pp. 54-64 (London, 1935); Fuller, M. L., 'Some Unusual Features of the Loess of China', *Geographical Review*, vol. xi, pp. 570-84 (New York, 1922); Tieh, T. Min, 'Soil Erosion in China', *Geographical Review*, vol. xxxi, pp. 570-90 (New York, 1941).

3. The *Soil Bulletins* and *Special Soils Publications* of the National Geological Survey of China and the various publications of the Kwangtung Bureau of Soil Survey and the Chekiang Soil Research Institute contain much useful material, but are not easily available.

## Chapter VIII

### CLIMATE AND WEATHER

General Features : Pressure and Winds : Temperature and Humidity : Precipitation : Weather Types : Climatic Regions : Bibliographical Note : Climatic Tables

#### GENERAL FEATURES

China is situated at the eastern fringe of the largest continental land mass in the world and climatically the continental influence is much stronger than the maritime. The unifying feature of all Chinese climatic types is the monsoonal regime. The term monsoon implies the reversal of winds between summer and winter. In summer, pressure is relatively high over the Pacific Ocean and the seas in tropical regions south of the equator, and sufficiently low over the heated continental interior of Asia to attract winds from various southerly directions, notably in China the south-east. In winter, dense cold air is piled up in the interior of Asia and from the high pressure regions thus developed the air flows out, chiefly as a north-easterly current, to the regions of lower pressure over the surrounding seas (Figs. 71, 72).

The monsoonal regime is experienced from Kamchatka to Arabia, but with many variants of type. In China, the winter monsoon is the more marked and persistent; during the autumn it spreads its influence from north to south over the whole country, interrupted only by the Siberian and Central China depressions which cross the country from west to east. The summer monsoonal indraught is gentle in approach and the rainfall steadily increases to a maximum in June to August. Much of the heaviest rainfall at Chinese stations is associated with typhoons, which are sharp cyclonic disturbances coming from tropical latitudes north of the equator. These are felt chiefly, but not exclusively, on the coasts.

The following summary of conditions at eight climatic stations

shows the contrasts of climatic regime between North and South China and the comparative uniformity in Central China. Over the whole of China, the summer months have mean monthly temperatures of 26–30° C. (80–86° F.), but in winter there is a decrease from 15° C. (50° F.) at Hong Kong to –4° C. (25° F.) at Tientsin. The seasonal range is also seen in the number of months grouped as cold (0° C., 32° F. or less), cool (0–10° C. or 32–50° F.), warm (10–20° C. or 50–68° F.), and hot (over 20° C., 68° F.). The annual rainfall shows a decrease from south to north and the percentage of rain falling during the summer monsoon period is much greater in the north as illustrated by Tientsin than at the three stations of the Yangtze valley (Fig. 70).

PEIPING.—January, –4° C. (25° F.); July, 28° C. (82° F.); range, 32° C. (57° F.). COLD, three months, December to February; COOL, two months, March and November; WARM, three months, April, September, October; HOT, four months, May to August. Rainfall, 637 mm. (25 in.), June to September, 86%.

TIENTSIN.—January, –4° C. (25° F.); July, 27° C. (80° F.); range, 31° C. (55° F.). COLD, three months, December to February; COOL, two months, March and November; WARM, three months, April, May and October; HOT, four months, June to September. Rainfall, 535 mm. (21 in.), June to September, 83%.

SHANGHAI.—January, 3° C. (38° F.); July and August, 27° C. (81° F.); range, 24° C. (43° F.). COOL, four months, December to March; WARM, three months, April, October, November; HOT, five months, May to September. Rainfall, 1,138 mm. (45 in.), June to September, 53%.

HANKOW.—January, 4.5° C. (40° F.); July and August, 30° C. (85° F.); range, 25° C. (45° F.). COOL, three months, December to February; WARM, four months, March, April, October, November; HOT, five months, May to September. Rainfall, 1,259 mm. (50 in.), June to September, 47%.

CHUNGKING.—January, 9° C. (49° F.); August, 29° C. (84° F.); range, 20° C. (35° F.). COOL, two months, January, February; WARM, five months, March, April, October to December; HOT, five months, May to September. Rainfall, 1,103 mm. (43 in.), June to September, 55%.

WENCHOW.—January, 8° C. (46° F.); July and August, 28° C. (82° F.); range, 20° C. (36° F.). COOL, two months, January, February; WARM, four months, March, April, November, December; HOT, six months, May to October. Rainfall, 1,299 mm. (51 in.), June to September, 49%.

HONG KONG.—February, 14° C. (59° F.); July, 28° C. (82° F.); range, 14° C. (23° F.). WARM, four months, December to March; HOT, eight months, April to November. Rainfall, 2,161 mm. (85 in.), June to September, 68%.

KUNMING.—January, 9° C. (49° F.); July and August, 21° C. (70° F.); range, 12° C. (21° F.). COOL, two months, December, January; WARM, five months, February to April, October, November; HOT, five months, May to September. Rainfall, 1,056 mm. (42 in.), June to September, 70%.

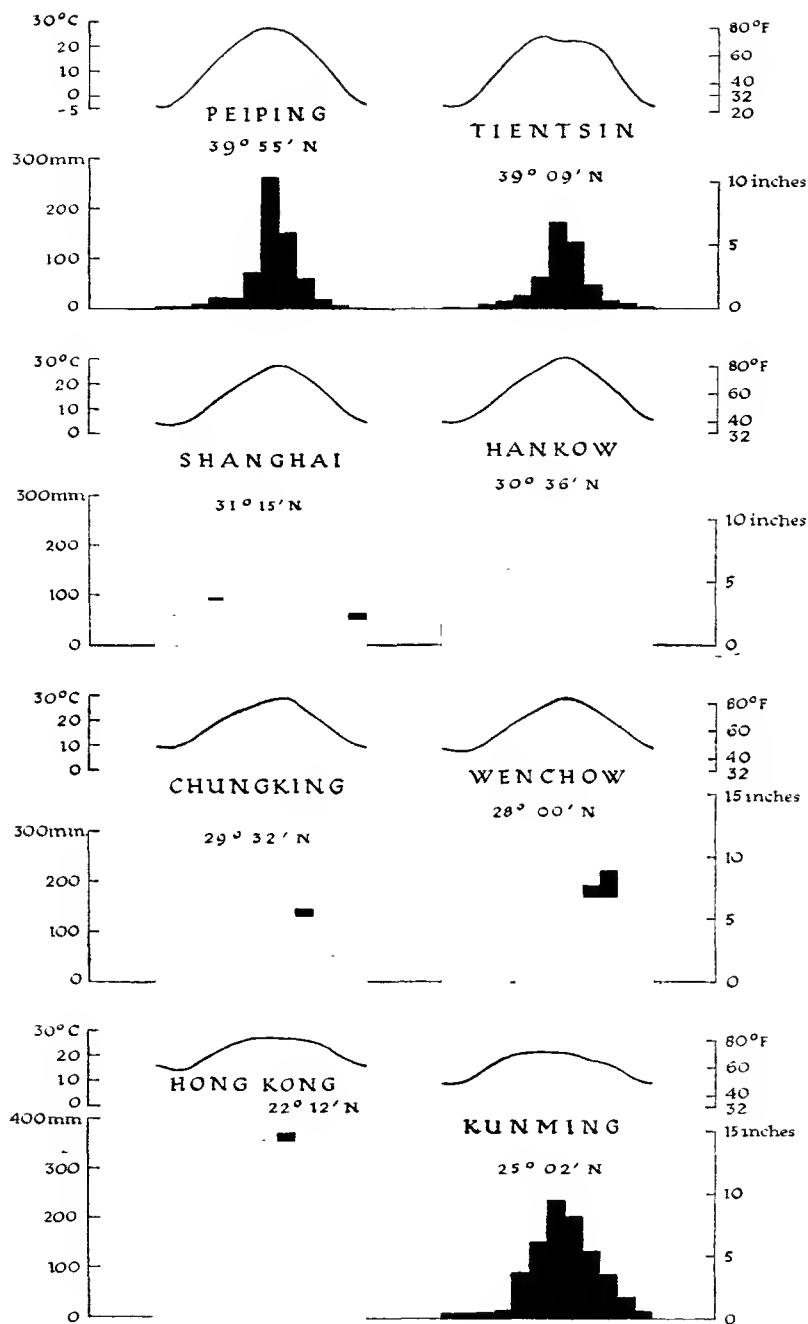
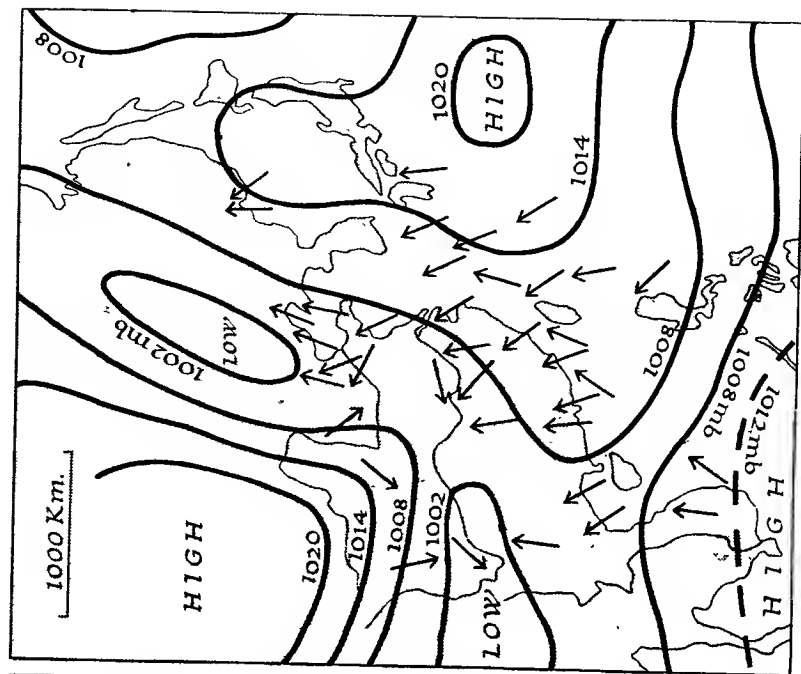
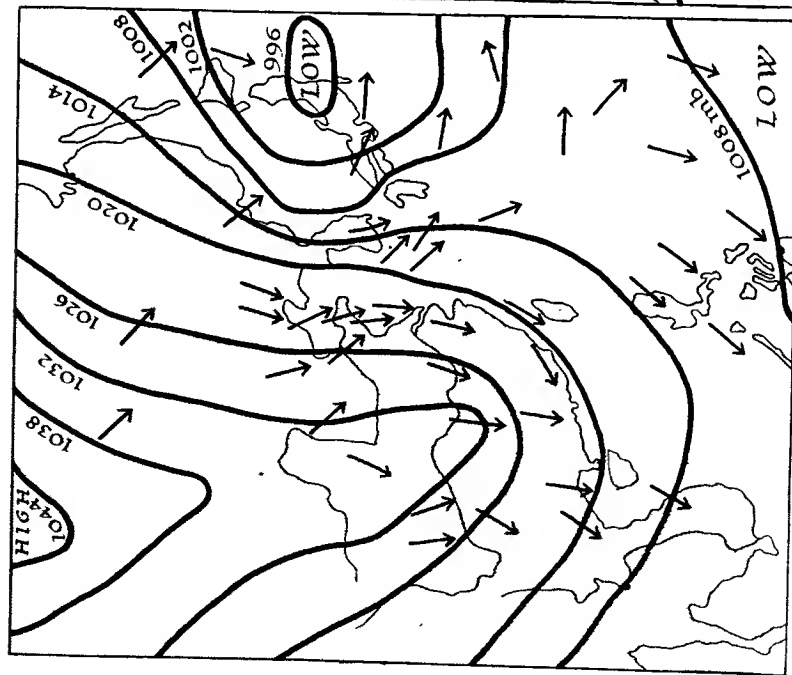


Fig. 70. Temperature and precipitation at eight stations

Based on Buck, J. L., *Land Utilization in China*: Statistics, pp. 3, 4, 7 (Nanking, 1937).

The range of temperature is greatest in North China, where the winter winds blowing from Siberia bring cold conditions. Summer temperatures are remarkably uniform throughout China. The summer maximum of precipitation is seen at all stations but most clearly marked in the north. Elsewhere rainfall is associated with depressions, especially during spring and autumn.



Based on Buck, J. L., *Land Utilization in China* : Atlas, p. 18 (Nanking, 1937).  
 Fig. 71 shows the outblowing winds from land to sea, which are north-west in North China, north in Central China, and may swing round to north-east along the south-east coast. High pressures are established over Siberia and low pressures over the oceans.  
 Fig. 72 shows the reverse conditions of summer. The main movement of air is from the sea to land with south-east winds predominant. Low pressures exist over south-western China, Manchuria, and, at times, over Siberia.

## PRESSURE AND WINDS

*Seasonal Regime*

*Winter.* The centre of the winter high pressure area is frequently located over the Gobi desert. The first cold winds usually occur in the early part of September or even as early as the third week of August, and the winter monsoonal circulation southwards of cold polar or Siberian air appears more definitely in October and covers the whole of China in November. From December to February there is one line of air movement to the equator. The air currents, north-westerly in the north of China and veering to north-easterly in the south, merge into the trade winds which then blow from about  $22^{\circ}$  north to the equator in the western part of the Pacific. In February the high pressure area over Siberia begins to disintegrate and fluctuate in position. The northerly winds become irregular and weaker and depressions, due to the mingling of southward moving polar and northward moving tropical air masses, become more numerous (Figs. 71, 73).

*Spring.* During the spring transitional period, southerly winds become more frequent. By the middle of April, or even earlier, northerly winds have ceased to exist as a continuous current though they persist locally, as in the Formosa strait, as late as the end of May. The Asiatic anti-cyclone is gradually replaced by low pressure systems over the continental interior and southerly winds become predominant over the whole of the China sea, Indo-China and the Philippines in May (Fig. 73).

*Summer.* Early in June, southerly winds are established as far north as the Yangtze and by mid-June over most of the western regions of China, reaching their fullest development in July and August. Even in midsummer, except in the extreme south, this monsoonal indraught is less persistent than the northerly winds of winter and in coastal regions may be modified or reversed by land and sea breezes. Other special developments of the summer are typhoons, to be discussed later, and cyclonic disturbances which may give thunderstorms, squalls and sharp, heavy rainfall, especially in North China (Figs. 74, 77, 91).

The monsoonal currents of summer come from the Pacific, from north Australia and from the south-west, and are related to the Indian monsoonal circulation. Most regions of China have their heaviest rainfall in July, due to the flooding of the country by damp and hot equatorial air masses. In July, south-west winds

prevail with winds tending to run parallel to the coast in the neighbourhood of high land. In the South China sea the direction is mainly from between south and south-west; over the East China sea the direction is between south-east and south-west; at the

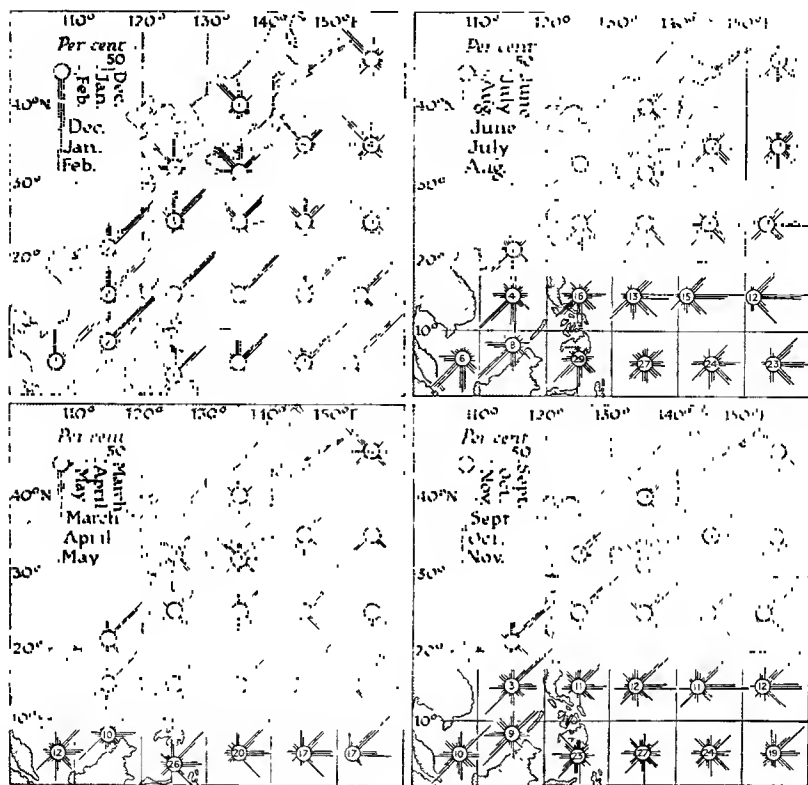


Fig. 73. Monthly incidence of winds over the sea

Based on *Weather in the China Seas*, vol. i, part 1, pp. 32, 36, 38, 40 (London, 1938).

The figure in the circle indicates the percentage of calms. The two upper maps show the reversal of winds from the trades of winter to the inblowing monsoon winds of summer. The two lower maps show the transitional conditions of spring and autumn.

mouth of the Yangtze, south-east; over the Yellow sea and Shantung peninsula south, while in the Gulfs of Pohai and Liaotung, especially near the coast, wind direction is much modified by land and sea breezes. The winds of the summer monsoon are stronger in the south than in the north (Figs. 72, 73).

*Autumn.* In August the south-east monsoon is still dominant over Manchuria, north and east China. The Siberian air masses advance into Manchuria and the transitional period of autumn may be marked by sudden bursts of cold northerly winds, followed by temporary returns almost to summer conditions. During September the Siberian air streams advance and all oceanic currents are driven out of China, which is once more under the complete control of Siberian air. The equatorial air masses retreat to regions south of lat.  $15^{\circ}$  N. In October the Siberian high pressure regime is fully established (Fig. 73).

### *Depressions*

Depressions and typhoons form an important element in the climate of China. Table II shows the average number of depressions per month and the greater number for 1921-30 is due to the inclusion of all depressions, whether on the coast or inland. Over eastern Asia there are probably about forty to fifty well-developed depressions each year, of which about half occur from March to June. Of the annual total, about thirty may be classified as Central China depressions and fifteen to twenty as Siberian. Few of the latter group affect any part of China Proper.

The actual number of depressions differs markedly from year to year. In 1929, twenty-four Central China depressions were noted, but there were thirty-nine in 1931, with six in July against an average of one or two, causing excessive rainfall and floods in Hankow (Fig. 74; see also p. 93 and Fig. 31).

The winter rainfall of Central China is largely associated with depressions. Definite 'cold waves' have been recognized from October to May. These are detached fragments of the Siberian anticyclone bringing cold weather far south into China. The Red Basin is apparently protected from these by its bordering mountains.

### *Typhoons*

Typhoons or tropical cyclones are small but very intense disturbances with exceptionally low pressures in their centres and steep barometric gradients. In general about half these storms develop winds of hurricane force (over 75 m.p.h.) at some time. Typhoons are an immense danger to navigation and in the summer months may cause heavy damage along the south-east



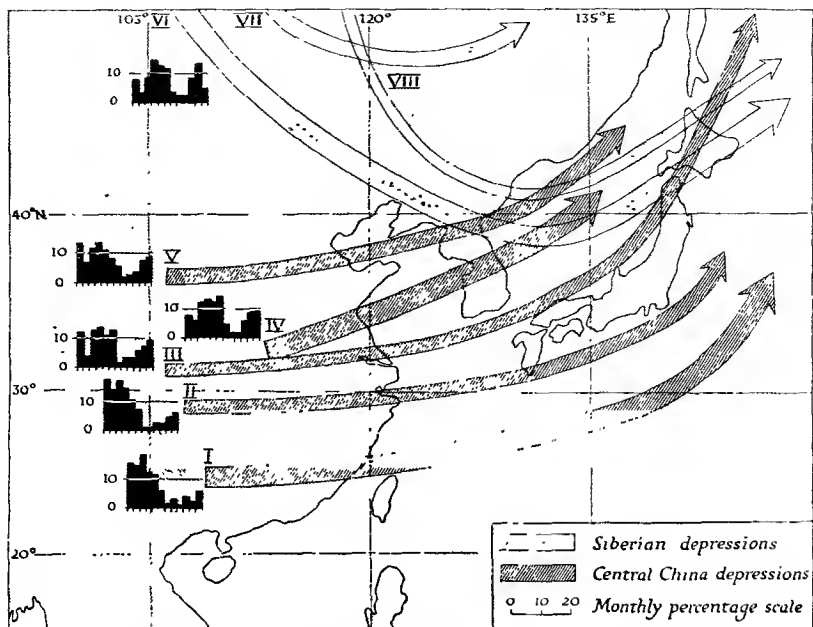


Fig. 74. Paths of depressions with monthly percentage scales

Based on *Weather in the China Seas*, vol. i, part 1, p. 52 (London, 1938).

Siberian depressions rarely affect China Proper, but Central China depressions bring varied weather and appreciable rainfall in spring and autumn to the greater part of the country.

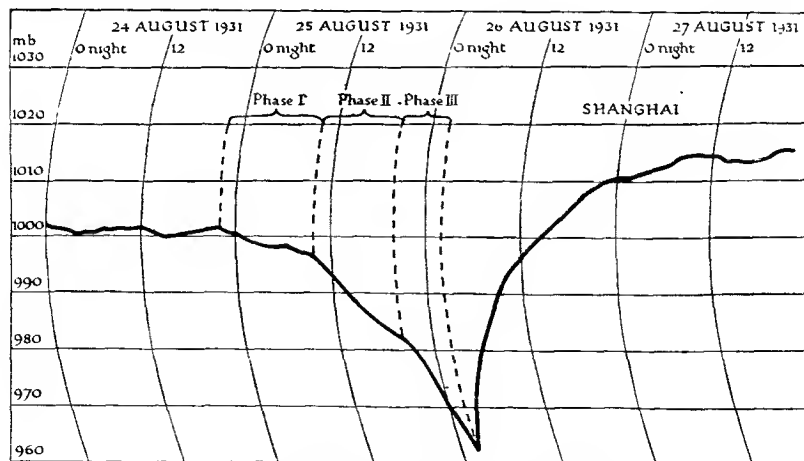


Fig. 75. Barogram of typhoon, Shanghai

Based on *Weather in the China Seas*, vol. i, part 2, p. 41 (London, 1938).

The sharp fall of pressure is well marked but, in this example, less intense than in areas over the sea.

coastal fringe of China. Many ships have been lost in typhoons and it was estimated that 50,000 lives were lost in the Swatow typhoon of 1922, partly as a result of a storm wave (Fig. 75).

In some cases, a single typhoon is dominant, but in others, during

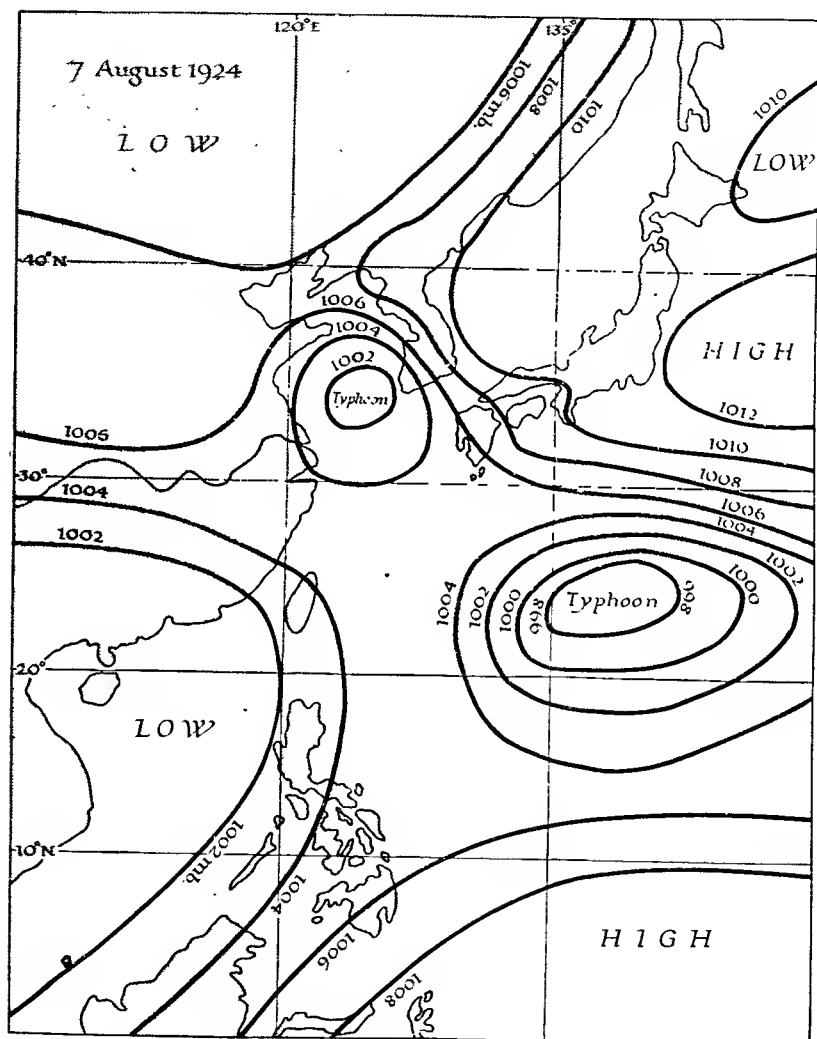


Fig. 76. Distribution of pressure, 7 August 1924

Based on *Weather in the China Seas*, vol. i, part 2, plate xxv (London, 1938).

A typhoon approaching the Gulf of Pohai has lost most of its force, but a second typhoon, developing over the ocean, may reach the coasts of China.

the period of maximum frequency from July to October, storms may follow one another quickly, and two or more found raging at the same time in different regions. Fig. 76 shows two shallow typhoons in relatively high latitudes. Typhoons decrease gradually in intensity as they move into higher latitudes.

From January to May, only very occasional typhoons are likely on the coast of China; in effect, China is protected by the winter anti-cyclone. Until May, the most frequented path lies to the east of the 120th meridian, but in this month, typhoons may spread into the Gulf of Tongking and the Formosa straits. In June there are two principal lines of movement, through the Balintang channel between Formosa and Luzon, striking the coast in the vicinity of Swatow, and across the central portion of the Philippines and entering the South China sea from the north into the Gulf of Tongking (Fig. 77). The East China sea and the southern half of the Yellow sea are no longer safe, and a large portion of the Sea of Japan lies within the danger area. There are two small areas rarely visited at this period, one extending roughly 250 km. on either side of Hong Kong, and the other from Amoy to Foochow.

July marks the beginning of the typhoon season proper, and by the middle of the month no part of the coast of China is safe. Assaults upon the Chinese coast are also likely in August, for during this month typhoons reach their most northerly extension. Towards the end of August the southward movement begins and the Yellow sea and the Sea of Japan are practically immune by October. Thus the danger season for typhoons is chiefly from June to September, and from June to August the tendency to recurve over the sea is least marked. Four or five out of an annual average of six to eight may strike the coast somewhere between Hainan island and the mouth of the Yangtze. They tend to fill up over the land, but some storms of typhoonal origin may penetrate as far as Hankow. Typhoons are the only well-marked travelling cyclonic storms of tropical origin, but some insignificant little disturbances develop over the Gulf of Tongking during the spring and summer months and move towards Formosa, after causing squally weather and thunderstorms along the south-east coast of China and over Formosa. The establishment of the winter monsoonal circulation preserves the Chinese coast from typhoonal visitations in winter.

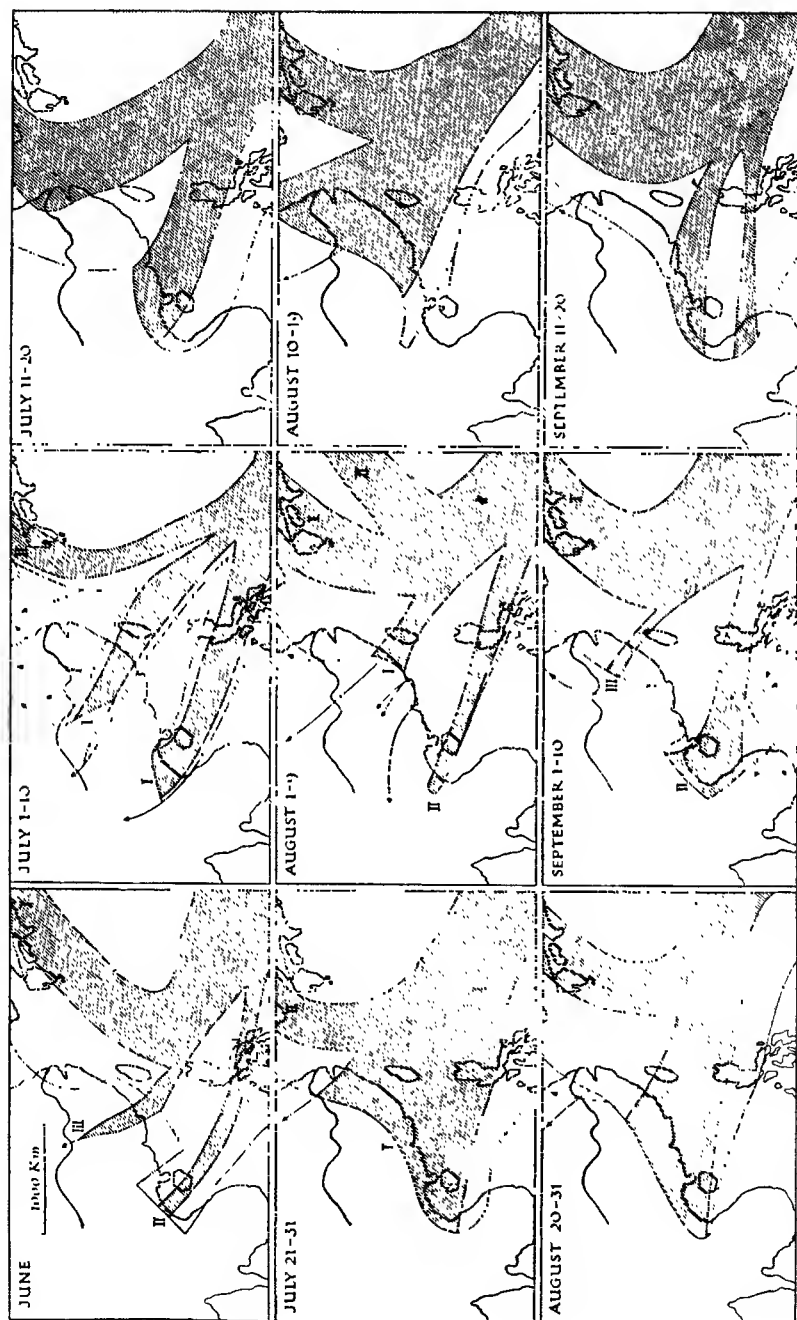
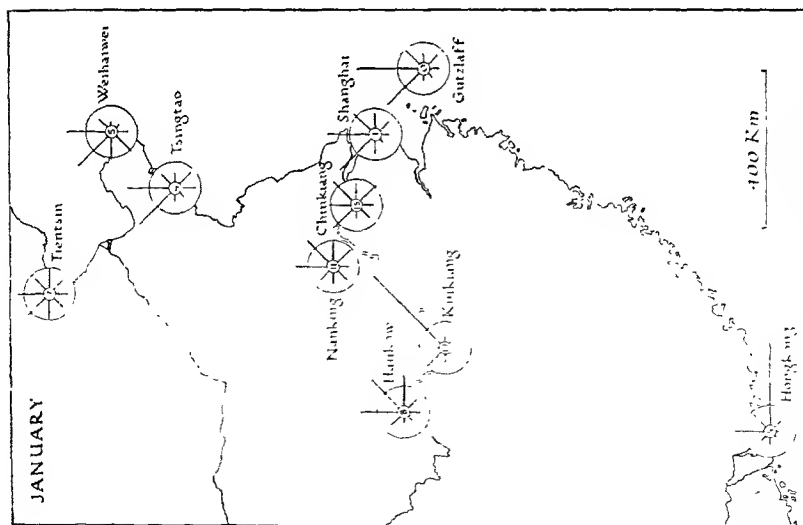
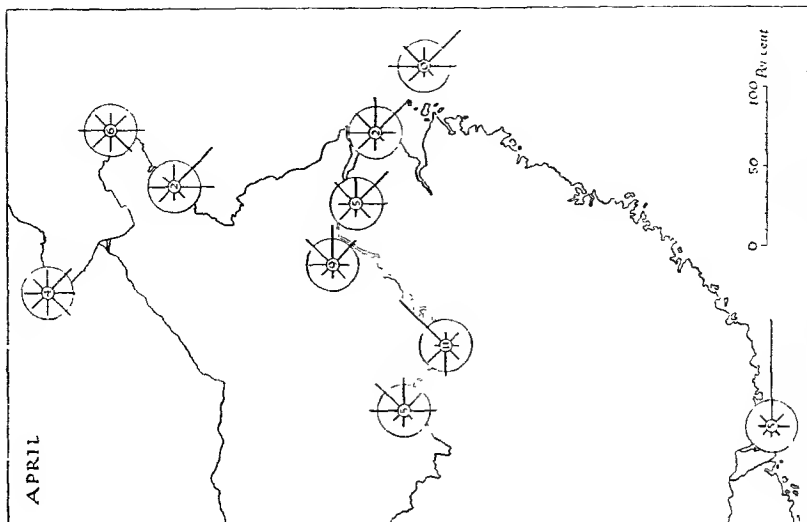


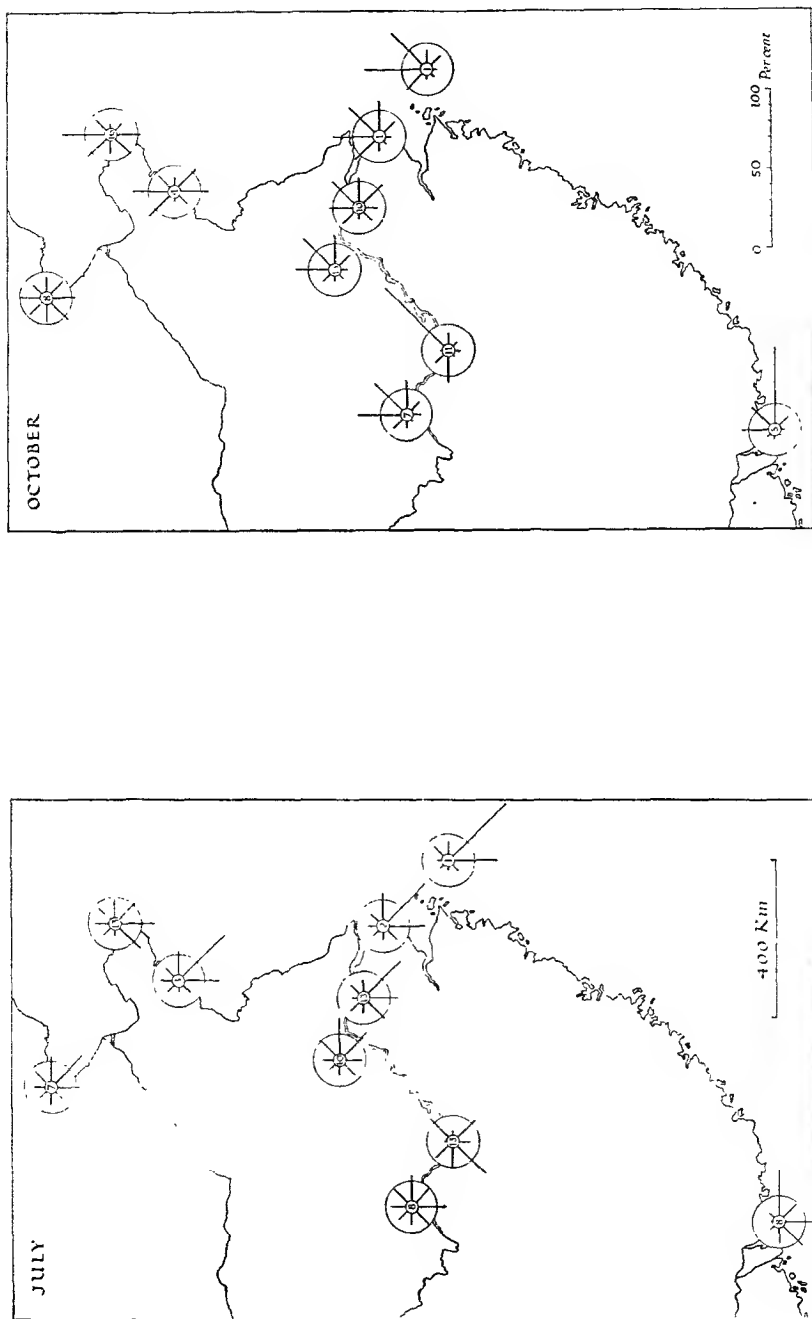
Fig. 77. Typhoon tracks during the summer months. Based on *Weather in the China Seas*, vol. i, part 2, plates viii-xii (London, 1938). The figures i, ii, iii indicate tracks in order of frequency. Over the China coasts the tracks move northwards in mid-August. The small arrows show individual typhoon tracks, some of which reach as far inland as the Hankow area, with disastrous effects.



Figs. 78 and 79. Winds, January and April.

In *January* northerly winds predominate at all stations except Hong Kong, where east winds, allied to the trades, prevail. In *April*, a time of transitional conditions, south and east winds are becoming established. The figures in the circles indicate the percentage of calms.





Figs. 80 and 81. Winds, July and October. Based on *Weather in the China Seas*, vol. ii, tables (London, 1938).

South-east winds predominate at most stations in *July*, when the summer monsoon is well established. Local topographical conditions influence some stations such as Kiukiang. In *October* northerly winds are already well established, showing the transition to winter conditions.

*Winds* (Table III, p. 250)

Figs. 78–81 summarize wind directions and show that the selected stations in north and Central China have an appreciable percentage of winds from any given direction at any season, with an expected predominance of winds between west and north at Weihaiwei in winter and from easterly and southerly directions in summer. At Nanking, the winter monsoonal winds are from northerly and even easterly directions. In summer nearly half the winds are from the east and south-east and others come from the north-east, south and south-west. Gutzlaff shows the seasonal reversal of winds more clearly than other stations, and at Hong Kong winds from north to east dominate in winter and from east to south-west in summer, with a strong tendency towards east wind dominance in spring and to a less extent in autumn. The April and October figures show transitional conditions.

*Gales*

Little reliable information is available on wind force, but in general the strength of the winter monsoon is much greater in the north than in the south. The summer monsoon on the other hand is stronger in the south. At Weihaiwei only five gales out of an average of twenty-eight come in the summer monsoon season, May to September. The remainder are associated largely with the arrival of cold air in the rear of cyclonic disturbances and blow almost exclusively from some northerly direction, accompanied by a rise of pressure. In the south gales, associated with typhoons and less sharp disturbances, may blow from any direction and are accompanied by a fall of pressure.

The summer monsoon itself is rarely of gale force, but squally weather is frequent; the wind seldom exceeds force 5 along the coast from the Yangtze to Hong Kong. Near the coast these winds may be lost in land and sea breezes. The careful observations of wind force at Nanking show an average of twenty-eight gales, with the greater number in spring and early summer. These gales are generally associated with sudden squalls of short duration due to the passage of depressions. Winter gales have a similar origin and, though less frequent, are more prolonged. In July and August typhoons occasionally penetrate sufficiently far inland to cause strong winds and possibly gales as far up the Yangtze as Hankow.

## TEMPERATURE AND HUMIDITY

*Seasonal Regime* (Table I, p. 248)

*Winter.* The marked contrasts in winter between North, Central and South China help to give individuality to the climatic regions. In February, the coolest month over the seas, there is a marked decrease in temperature from about 18–20° C. (65–70° F.) in the

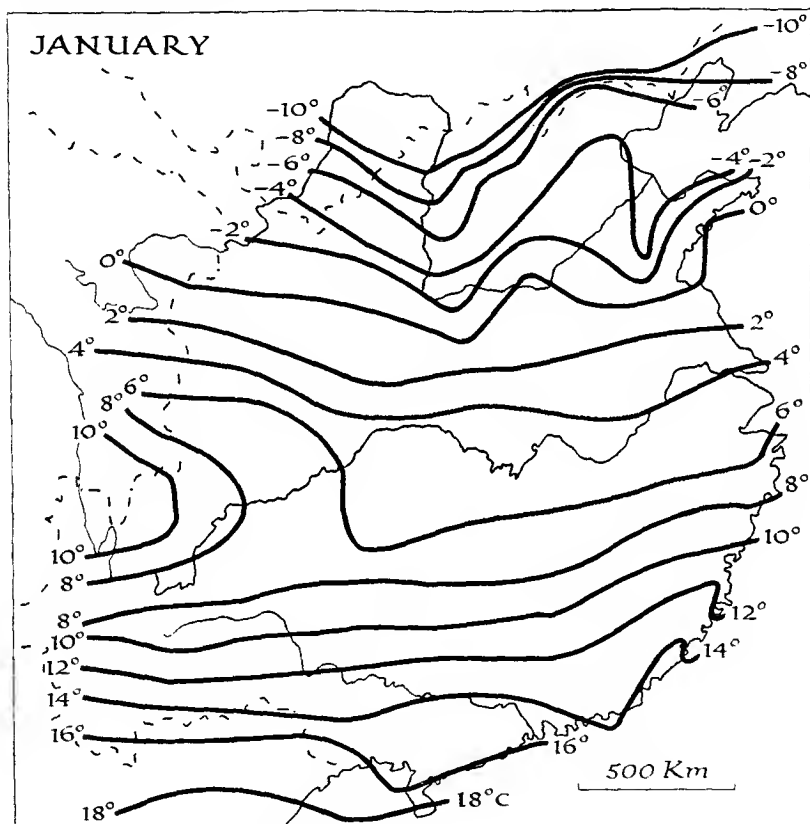


Fig. 82. Isotherms, January

Based on Buck, J. L., *Land Utilization in China : Atlas*, p. 24 (Nanking, 1937).

There is an obvious decrease in temperature from south to north but the relatively warm winter conditions in Szechwan should be noticed.

Gulf of Tongking to freezing point in the Gulf of Pohai. In the gulfs of Pohai and Liaotung ice is liable to form on the mud flats in the coastal regions from the middle of November to the end of March. It gradually becomes compact, filling the head of the Gulf



of Pohai, and in some years is of considerable extent. Field ice, over 20 sq. miles in extent and six in. thick, has been recorded to the south-east of Taku in January, and drift ice has been met 75 miles to the east. Ships have been frozen in at Chefoo for a short time (Fig. 84).

The greater part of the North China Plain has one to three months with mean temperatures below freezing point and frosts are quite usual between late October and early April in North China and the rivers are generally frozen over for some time. The Hai ho and its tributaries, with the port of Tientsin, are frozen over for two or three months, the lower Hwang ho for thirty days and the Hwai ho for ten to twenty days (Plate 109).

In the Yangtze valley there is a well marked cool season of three to four months, from December to February or March. In the Yangtze delta, the mean monthly temperatures are extremely low for the latitude ( $2^{\circ}\text{C.}$ ,  $36^{\circ}\text{F.}$  at Nanking in January), and frosts may occur between November and March inclusive. The latest recorded frost is on April 6th. Ice may form on the Yangtze and the Grand Canal. In the Central Yangtze Basin, cool temperatures are recorded from December to February, with minima of  $4.5^{\circ}\text{C.}$  ( $40^{\circ}\text{F.}$ ) and  $7^{\circ}\text{C.}$  ( $44^{\circ}\text{F.}$ ) in January at Hankow and Changsha respectively. In the Red Basin of Szechwan, winter is rather warmer, with three cool months, December to February, at Chêngtu (minimum January,  $7^{\circ}\text{C.}$ ,  $44^{\circ}\text{F.}$ ) and two cool months at Chungking (January and February) of which the former has  $9.2^{\circ}\text{C.}$  ( $49^{\circ}\text{F.}$ ) (Plate 110).

In the Yangtze Basin the winter temperature rises gradually from the delta inland towards the Red Basin. Dry continental winds sweep across the North China Plain and across the fringing seas, bringing cold and penetrating blasts to the Yangtze delta, where there is no natural protection by mountains. The Central Yangtze Basin is to some extent protected from cold north winds by mountains, notably the Tsinling shan and the Tapa shan. The hills around the Szechwan Basin are a natural bastion preventing the incursion of cold conditions. Not only so, but the whole basin slopes southwards to the Yangtze in a series of long south-facing ridges. Chungking is warmer than any place in the British Isles in January, Chêngtu as warm as Cornwall but Shanghai as cold as Edinburgh (Fig. 82).

The winter temperature increases steadily from the Yangtze delta southwards, and sub-tropical conditions are found around the

Canton delta, in the Si kiang valley and along the south-west of Kwangtung. The effect of altitude is clearly seen in Yunnan, where the January temperature is about  $9^{\circ}\text{C}$ . ( $48^{\circ}\text{F}$ .).

The daily range of temperature varies according to local relief features and is generally higher inland than on the coasts. The

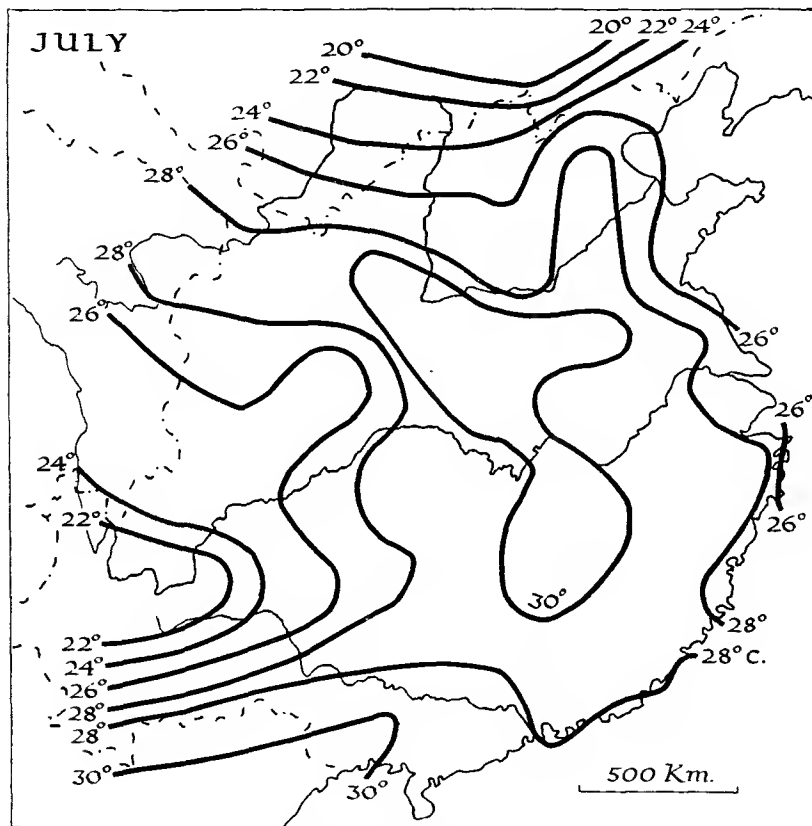


Fig. 83. Isotherms, July

Based on Buck, J. L., *Land Utilization in China: Atlas*, p. 25 (Nanking, 1937).

The summer is hot over almost the whole of China: slightly cooler conditions occur on the coasts, in the extreme north, and in the highlands of the west.

material available is slight, but it seems probable that the diurnal range in the clear air of winter is about  $5\text{--}8^{\circ}\text{C}$ . ( $10\text{--}15^{\circ}\text{F}$ .) in the north,  $11\text{--}14^{\circ}\text{C}$ . ( $20\text{--}25^{\circ}\text{F}$ .) in tropical regions in sheltered positions on the mainland and  $5\text{--}8^{\circ}\text{C}$ . ( $10\text{--}15^{\circ}\text{F}$ .) on coasts exposed to monsoons.

*Spring and Summer.*—In spring the temperature over the ocean rises slowly, and in summer quickly to a level of  $28-31^{\circ}\text{C}$ . ( $80-85^{\circ}\text{F}$ .) over a vast area between the equator and  $30^{\circ}$  north with the greatest heat over the Kuro Siwo, the warm current in the Pacific Ocean which is comparable with the Gulf Stream in the Atlantic. Most of the winds reaching China in summer have blown over the Kuro Siwo and are charged with warmth. The air over the shallow seas of China north of the Yangtze is only slightly cooler than that over the Kuro Siwo (Fig. 84).

The rise of temperature over the land in spring is very rapid, especially in the north, and the hottest time of the year is July and August when temperatures are fairly uniform over the whole region, rising to  $29-33^{\circ}\text{C}$ . ( $85-90^{\circ}\text{F}$ .) by day and falling to  $24-26.5^{\circ}\text{C}$ . ( $75-80^{\circ}\text{F}$ .) by night. The temperature in these months rarely falls to low levels and less than  $15^{\circ}\text{C}$ . ( $60^{\circ}\text{F}$ .) is rare even in the north, while in the south the temperature is rarely below  $21^{\circ}\text{C}$ . ( $70^{\circ}\text{F}$ .). In the Yangtze valley, temperatures may exceed  $37^{\circ}\text{C}$ . ( $100^{\circ}\text{F}$ .) in summer, but exceptionally high temperatures are of short duration and end suddenly in storms (Fig. 83).

*Autumn.*—This season is considerably warmer than spring and the temperature in September is higher in all parts than in May. The autumn is generally regarded as the best period for weather in China, but there may be large variations of temperature and the fall of temperature is more rapid than the rise in spring, averaging ten degrees per month at some stations from August to December.

*Length of the Growing Season.*—The range of climatic types in China is illustrated in Fig. 85, which shows the length of the growing season. This is calculated as the period between the median date of the last day of spring and the first day of autumn with a mean temperature of  $6^{\circ}\text{C}$ . ( $43^{\circ}\text{F}$ .). In the extreme north of China the growing season, so defined, lasts for seven or eight months, from April to November. Central China has a growing season of ten months, from the end of January or some time in February to December. The Szechwan Basin, so favoured climatically, has one area in which the growing season lasts throughout the year. In the Si kiang valley and along the coastal fringe of the South-Eastern Uplands, there is no seasonal check to growth and one crop follows another in quick succession.

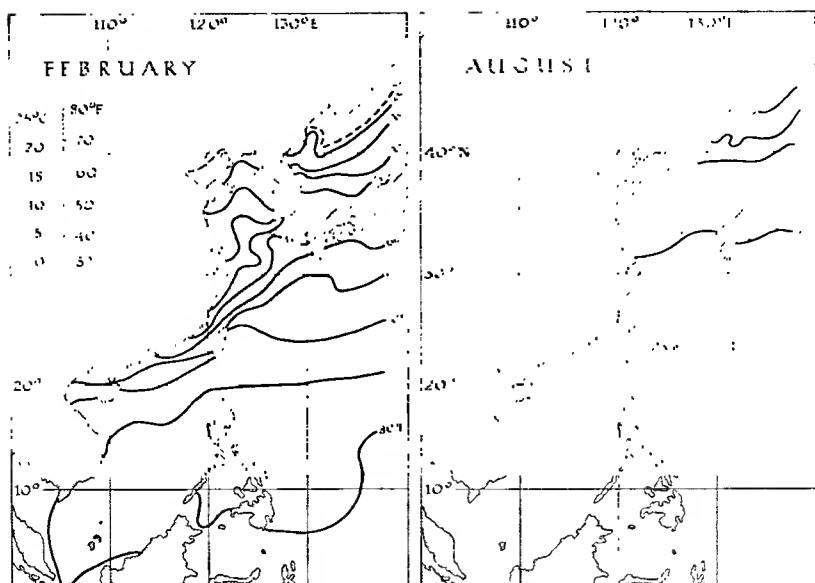


Fig. 84. Temperatures of the sea surface, February and August

Based on *Weather in the China Seas*, vol. i, part 1, pp. 88, 90 (London, 1938).

In *February* there is a steep temperature gradient from tropical warmth in the South China seas to frozen waters in the Gulf of Pohai. In *August* the warmth of the seas reflects the general warmth over the land.

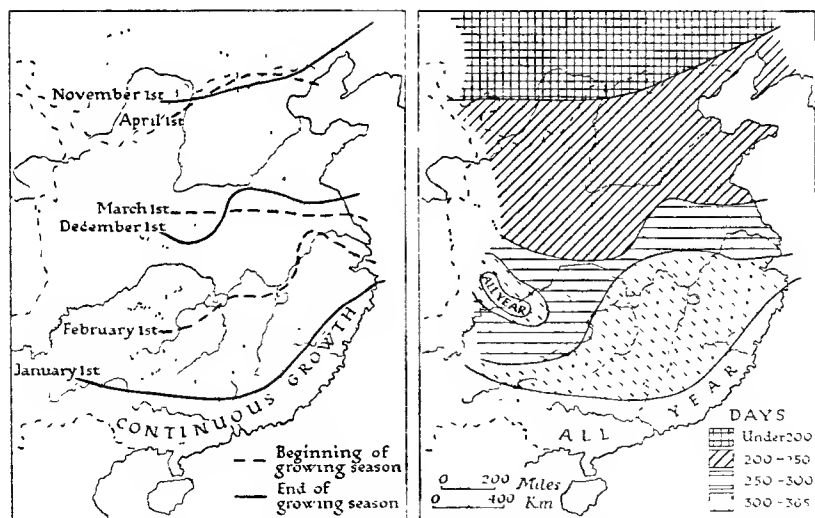


Fig. 85. Length and period of the growing season

Based on Buck, J. L., *Land Utilization in China: Atlas*, pp. 26-27 (Nanking, 1937).

The growing season is taken as the period between the median dates of the last day of spring and the first day of autumn with a mean temperature below  $43^{\circ}$  F. ( $6^{\circ}$  C.). This somewhat arbitrary figure has some validity, and these maps reflect the agricultural regime fairly closely.

### Humidity

The map of relative humidity through the year (Fig. 86) shows a gradual increase from north to south. There is an average of less than 50% in North China, over 70% in Central China and over 80% in South China. From the Yangtze southwards, lower humidities are normally recorded on the coasts than over the hilly interior.

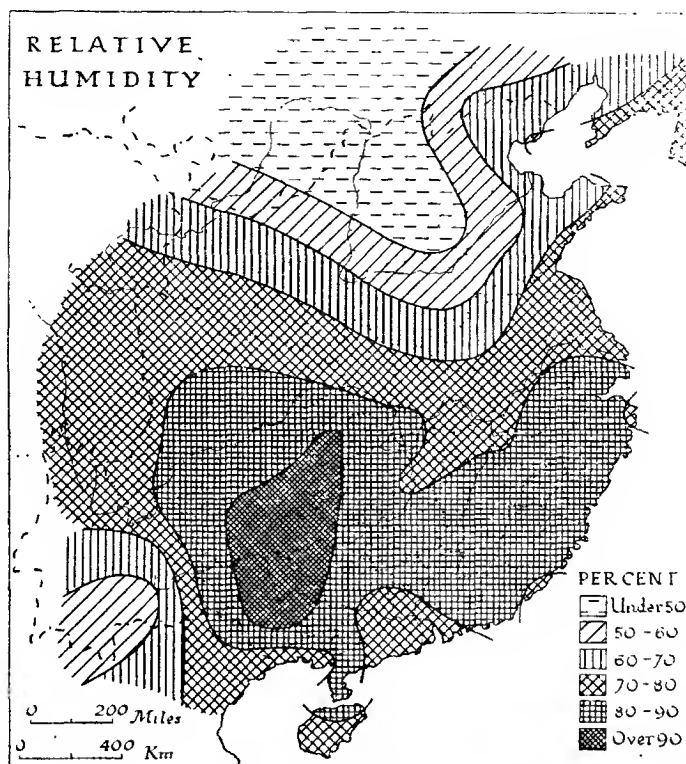


Fig. 86. Relative humidity

Based on Thorp, J., *Geography of the Soils of China*, p. 26 (Nanking, 1936). Humidity is greatest over the uplands of South China and decreases northwards towards the desert of Mongolia: Yunnan is also a relatively dry area.

In view of the paucity of exact observations, these generalizations must be regarded as tentative.

Mean monthly figures for humidity are available for nine stations on the coasts and along the Yangtze (Fig. 87 and Table IV). Over North China humidity reaches its maximum in July or August and is generally higher on the coast than inland. In most coastal

districts the relative humidity may reach saturation point in any month, but may fall below 20% or even below 10% in the north-west in winter and spring. Even in July, values of less than 30% have been recorded in the north.

The figures for Central China show minima in December and maxima in the summer with a very small range between them. The winter does not show the considerable proportion of clear skies and dry winds for which the north of China is well known. At Shanghai, however, values as low as 15% have been recorded in all months from October to June, while in each of the three months December, January and February humidity has fallen below 10%. In July, August and September the lowest records are 37%, 34% and 23% respectively, but saturation point is reached at times during almost every month. At Hong Kong the humidity reaches a maximum from March to May, but the humidity of the north-east monsoon season is very variable, according to the path of the winds over land or sea. In January 1918 it was 51%, and in January 1919 82%.

#### *Cloud* (Table V, p. 251)

The average amount of cloud is lowest in the north-west of China, increasing towards the south and south-west. On the shores of the Gulf of Pohai, the mean cloudiness rises from a minimum in January to a maximum in July, decreasing rapidly in August and September and then more slowly (Fig. 87). The average number of days with clear sky is not less than fourteen per month from October to February and in winter the sky is overcast only for an average of five days per month. Towards the end of February the frequency in the north-west of days with clear skies begins to decrease to a minimum in July, when it does not exceed five. Tsingtao shows the same general range, but with a higher proportion of cloud and greater humidity throughout the year.

In the Yangtze valley the cloud amounts are least in late autumn and early winter, and heaviest from February to June. When the early summer rains are over the cloudiness decreases to a minimum in November and December, but a slight rise in September marks the beginning of the winter monsoon. The days of the winter monsoon show great variations from year to year, and January to March may be remarkably fine in some years.

No adequate figures are available for the south-east coast of China, but observations over the sea show that the early months

of the northerly monsoonal season, from October to December, are the least cloudy, with a marked increase of cloud in January and a steady increase from February to June. The monsoonal wind comes off the sea more frequently in late winter and spring than in summer. In July, when the southerly monsoon is fully established, there is an average of little more than six-tenths with slightly less in August. The amount of cloud decreases with the full establishment of the northerly monsoon in autumn.

At Hong Kong, cloudy or overcast skies are most frequent from February to April, associated with the *crachin* period, generally a time of low cloud, drizzle and rain. In some years relatively fine

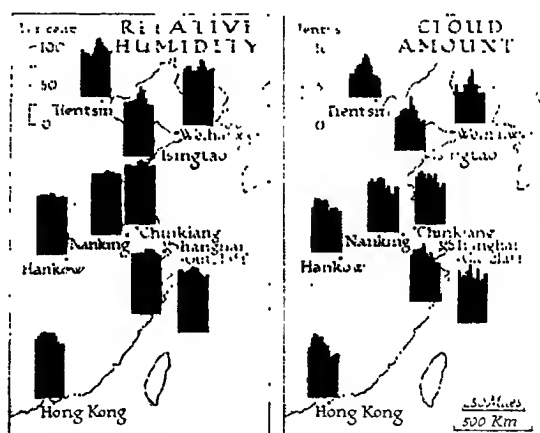


Fig. 87. Humidity and cloud amount

Based on *Weather in the China Seas*, vol. ii, tables (London, 1938).

Chinese skies are cloudy and the humidity rates at most Chinese stations are high for the greater part of the year though a seasonal regime will be noted, particularly in the north.

periods have been known to occur at Hong Kong in March, which is usually the most cloudy month. From May to September the cloud amount remains high, though lower than in the spring months. The arrival of the north-east monsoon in September marks the beginning of a fine period, with many cloudless days. There is an increase in December and January, but the clouds are generally above 3,000 ft. and very low clouds are not likely to occur until February (Fig. 88).

*Fog* (Table VI, p. 252)

In inter-tropical regions, fog is rare over the sea in all seasons and even north of the thirtieth parallel is comparatively infrequent in winter, but in the summer months the Pacific, north of the thirty-fifth parallel, is one of the foggiest regions in the world, notably over the cold Kamchatka current. In the north of the Gulf of Pohai, sea fog is seldom experienced from September to January, for cold northerly winds prevail and the mean temperature of the sea is higher than that of the air above it. Over the land, however, radiation fog may occur and visibility is often seriously impaired by dust and sand brought by the strong winds blowing

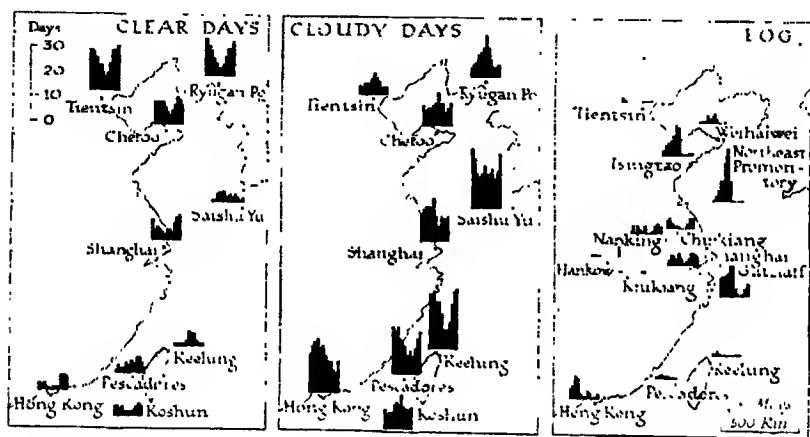


Fig. 88. Clear days, cloudy days and fog

Based on *Weather in the China Seas*, vol. i, part 1, pp. 138, 140, 152 (London, 1938).

The left and centre maps, covering only coastal stations, show that clear days are most frequent in the north during winter, in the south during summer. Fog is rare inland but occurs in spring and autumn along the lower Yangtze, and in summer at the Shantung stations.

from the deserts of Mongolia, especially around Peiping and Tientsin. The dust-laden atmosphere is most unpleasant and particles of sand irritate the eyes and throat. The haze may be very thick over the sea as far south as the thirty-fifth parallel.

In February the frequency of sea fog begins to increase with eight per month at the North-East promontory of Shantung, reaching an average of between fifteen and twenty days in June and July. Some



of these fogs persist for two or three days off Weihaiwei. There is a pronounced decrease in frequency everywhere in August, and by September fog is rare even on the coasts of Shantung. Over the Yangtze valley the frequency of fogs shows a slight increase in October, and in December and January there are four or five days of fog a month. At Woosung, on the Whangpoo river, fog is more frequent in November and December (seven per month) than in January to June (five per month). Around the Whangpoo, fog disperses towards noon with the heating of the land on either side of the river. At Hankow the yearly average is only ten, of which five are recorded for December (Fig. 88).

South of the Yangtze, fog and mist are very frequent near the coast in spring and bad visibility is nearly always found on the sea-route between Hong Kong and Shanghai. From November onwards the frequency of fog increases to a maximum in May or June, with an abrupt fall in June or July. At island stations off the east coast of China the average number of days with fog increases from three in November to between ten and fifteen in May, while from August to October fog occurs only on one or two days a month.

Bad visibility is frequent at Hong Kong during the *crachin* period from February to April and fog is likely to develop whenever pressure falls over China in the late months of the north-east monsoon season. The number of days with fog increases from four in January to nine in March and eight in April. From May to December fog is comparatively rare and only August, with an average of three days' fog, has more than two per month. In the vicinity of Hong Kong the visibility from the air is often affected by haze during the first half of the north-east monsoon season, from October to December, and the spring fogs may hold up ships outside the harbours for some time.

#### PRECIPITATION (Tables VII-IX, pp. 253-5)

The published maps of annual rainfall in China vary considerably and many more long range observations are needed before any reliable map can be produced. Though there is a considerable measure of agreement between the maps, they differ markedly on such vital points as the total rainfall of the North China plain. The map reproduced here (Fig. 89) is based on the most complete data available, but many of the meteorological observations cover an inadequate number of years, especially in view of the high degree of rainfall variability (Fig. 90).

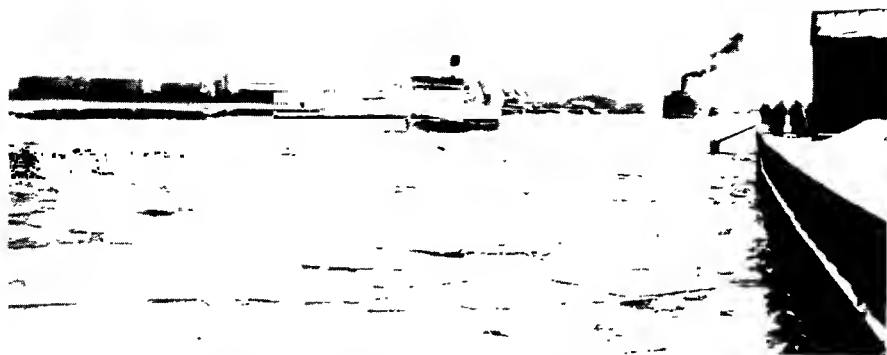


Plate 109. Ice breaker on the canal at Tientsin

The rivers and canals of the North China Plain are generally frozen over for two or three months of the winter.



Plate 110. The frozen Han at Hankow, 1920

Though the Central Yangtze Basin has low winter temperatures for its latitude, it is unusual for the rivers to be completely frozen.

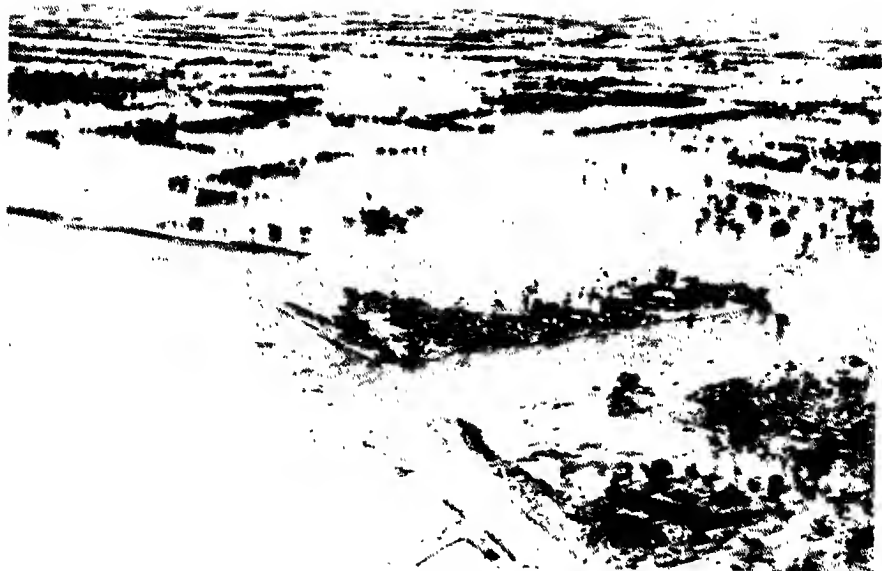


Plate 111. Hwai floods, 1931

The flood waters of the Hwai ho are breaking across the Grand Canal at Kaoyu, Kiangsu.



Plate 112. Floods at Hinghwa, Kiangsu

Another view of the disastrous floods of 1931.

*North China.*—In North China, the winter is almost rainless, with only two or three rain days each month and most or all of the precipitation from November to April, or even May, falls in the form of snow. Depressions which travel over land without appreci-

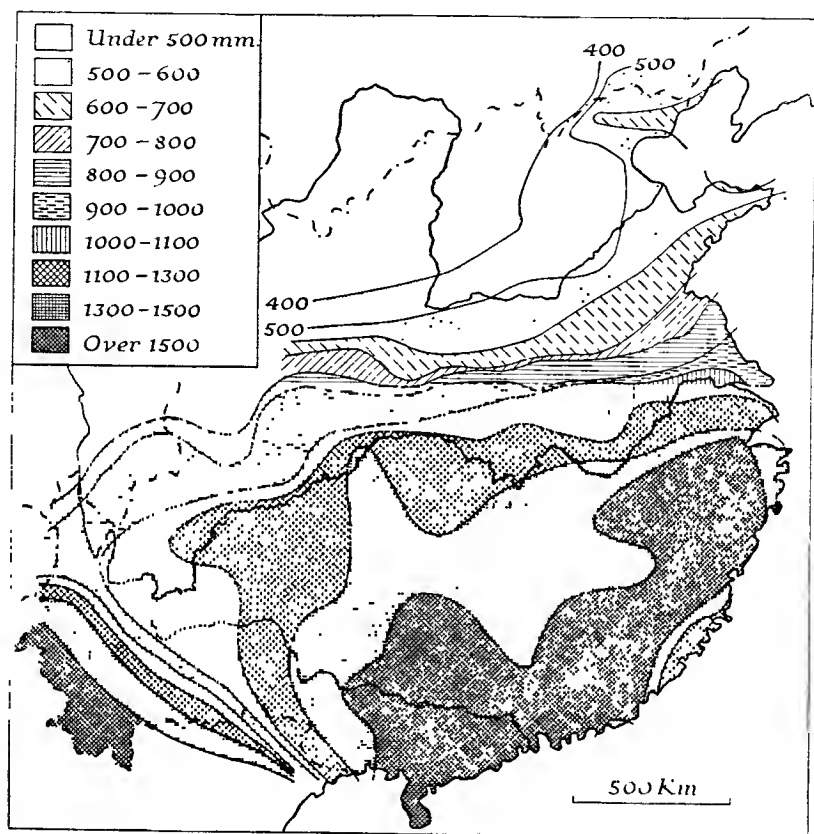


Fig. 89. Mean annual precipitation

Based on Buck, J. L., *Land Utilization in China: Atlas*, p. 19 (Nanking, 1937). The uplands of the south have a heavy rainfall (over 60 ins. per annum), but a large part of the north has so little rain as to make agriculture precarious.

able precipitation cause dust storms over land and severe blizzards over the sea. These may last for forty-eight hours over the coast and give some rainfall at coastal stations. In Shantung, snow is much more frequent along the northern than along the southern coasts. Most of the precipitation occurs in summer, from June

to September, when the rainfall is at least twice that of eastern England, but the number of rain-days is small (Fig. 91). The rain falls mainly during brief and scattered periods of disturbed weather,

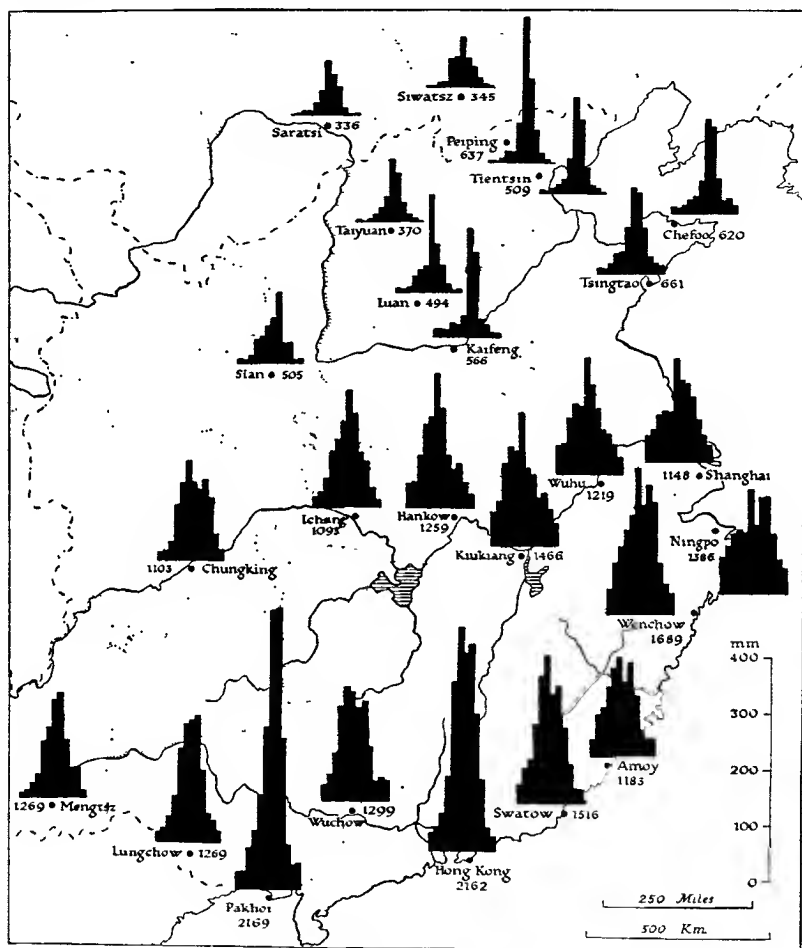


Fig. 90. Rainfall graphs

Based on Buck, J. L., *Land Utilization in China : Statistics*, pp. 3-4 (Nanking, 1937).

The total rainfall in mm. is shown under each graph. The summer maximum is apparent elsewhere, but most marked in the north and south. In Central China the influence of rain associated with depressions is seen.

associated with shallow depressions and, more rarely, typhoons or storms derived from them. These rainy spells are preceded and followed by relatively long periods of fair weather.

*Central China.*—The Yangtze valley is a region of transition, climatically as in other ways. The driest period is from November to February, and December has the lowest average rainfall of all months. There is a marked increase in April, and early summer is the rainiest period of the year with a remarkable increase of rain in June, due to the *Mai-u* or 'plum' rains associated with the beginning of the summer monsoon season. The month of greatest rainfall is either June or July and in August there is marked decrease of rain over the whole area, followed by a gradual diminution to

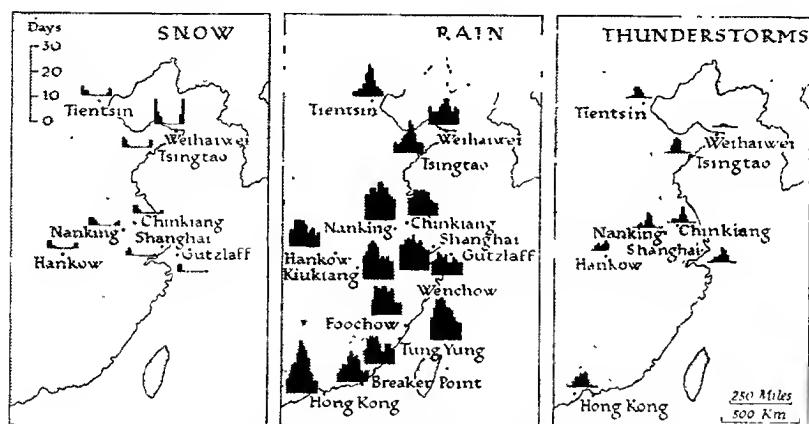


Fig. 91. Snow, rain, thunderstorms

Based on *Weather in the China Seas*, vol. i, part I, pp. 124, 162 and vol. ii, tables (London, 1938).

Snow occurs in mid-winter as far south as the Yangtze valley. The maps of rain days (i.e. days with 0.1 mm. or more rain) correspond closely with that of the seasonal regimes (Fig. 90) and shows the summer maximum to be best developed in the north. Thunderstorms occur chiefly during the summer months.

December. A drought may occur if the south-west monsoon winds persist for some weeks or even days in summer. Some atmospheric disturbance is necessary to induce the normally heavy rainfalls, which are associated with depressions, thunderstorms and typhoons. Sharp showers are associated with the few Central China depressions which develop in summer. Thunderstorms occur on a few days in each of the summer months. Typhoons affect the Yangtze during the summer (Fig. 77) and bring heavy rainfall to the delta and lower valley. On rare but important occasions they may reach Hankow.

In Central China, hail occurs only about once a year and snow on about three or four days in both January and February, on one or two days in December and March. There may be snow in November or April in very exceptional years (Fig. 91).

*South China.*—South of the Yangtze there is a gradual increase in the average annual precipitation of rain, with very heavy falls in mountain districts. Coastal stations have considerably less than those in the interior.

Along the south-east coast of China autumn is the least rainy period of the year with an average of five rain days per month. In January the rainfall begins to increase during the *crachin* period, a time of low cloud, drizzle and light rain; periods of *crachin* may be experienced from January to April and may last for over a fortnight. The south-west monsoon is generally fully established by the beginning of June and the summer months have the highest rainfall. Particularly heavy falls are associated with occasional thunderstorms and also with typhoons, during which as much as 500 mm. (20 in.) has been recorded in a single day.

*Regional contrasts.*—Fig. 92, showing the proportion of the mean annual rainfall received in each season, demonstrates some regional contrasts. In winter the drought is most complete in North China owing to the dominance of winds from the interior. The spring rains are well developed in South China and the moist oceanic winds are gradually spreading into North China. Conditions in summer are the converse of those in winter. By far the greater part of the annual fall in North China comes during these months. In South China only a small proportion of the total fall is received in this season. Autumn is a transitional season throughout China.

#### *Thunderstorms* (Table X, p. 255)

Thunderstorms are most frequent south of the Yangtze where there are twenty to thirty per year, as compared with ten to twenty farther north. They tend to be most frequent from June to August, when there is an average of five to six per month near the Yangtze, and of two to three north of 35°. However, at Peiping as many as thirteen have been recorded in both June and July. In the lower Yangtze east of Hankow, thunderstorms are most usual in July, with five or six, but as many as ten may occur in July and August, and the distribution farther south is generally similar (Fig. 91).

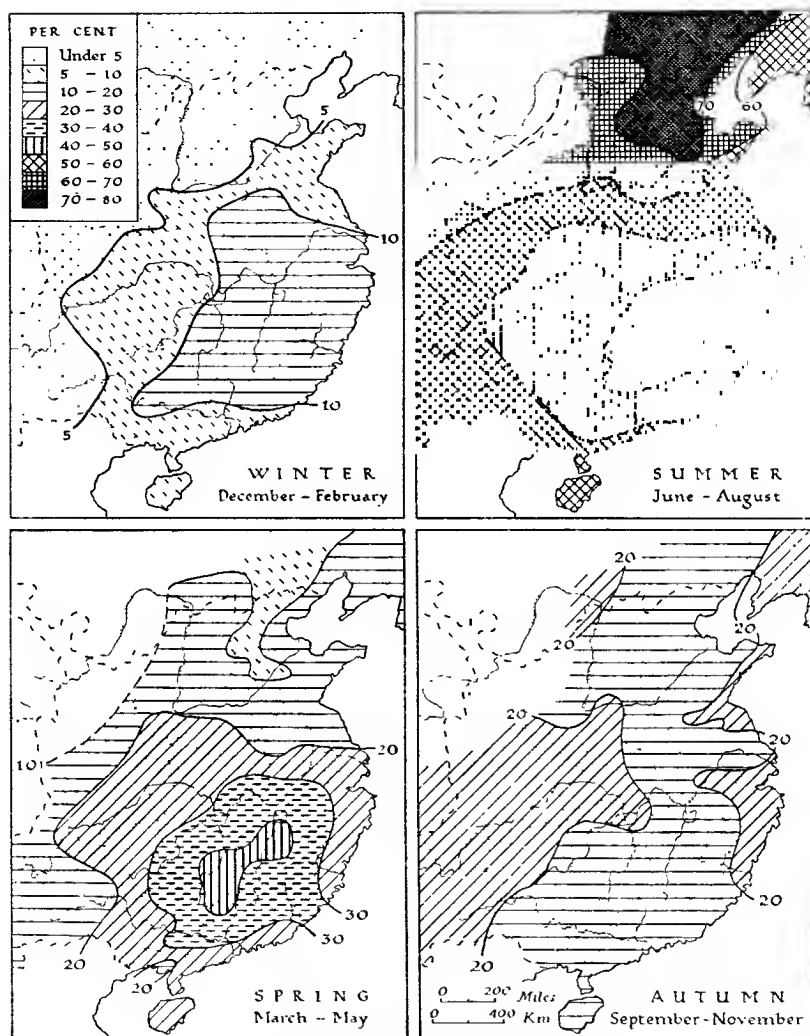


Fig. 92. Seasonal distribution of rain

Based on Buck, J. L., *Land Utilization in China : Atlas*, pp. 20-21 (Nanking, 1937).

Most of the rainfall occurs in summer, especially in the north, where the winter is almost completely dry. Spring rains associated with depressions are important throughout China, especially between the Yangtze kiang and the Si kiang. The autumn rains are most significant in the area of continuous cropping in the south.



*Variability of Rainfall*

The accidental element is very significant in the rainfall of China. Apart from local factors of a kind likely to operate anywhere, the passage of depressions of very varied intensity, the peculiar tracks of typhoons and the number of sudden thunderstorms and sharp convectional showers all introduce an element of uncertainty into the rainfall regime. Much of the rain comes in falls of great intensity causing serious soil erosion and the flooding of various river courses (Fig. 93).

The map of rainfall variability is based on the few adequate records available. The figures are for average variability and the extremes are very much greater and in individual years more significant. The diagram (Fig. 94) showing the June rainfall in Tientsin for a number of years illustrates the striking changes which may occur. Incidentally it demonstrates the acute limitations of the average figures usually given.

The variability is greatest in North China, increasing from south-east to north-west just as the rainfall decreases in the same direction. There is the scourge of both drought and flood, for the most skilled irrigation is dependent upon some regularity of water supply in streams and rivers. In the North China Plain, the variability is about 30%; in sixty-five years, there were four years with annual amounts exceeding 1,000 mm. (40 in.) and four with below 300 mm. (12 in.). The big fluctuations in the months when water is most needed are striking. In the last fifty-five years, Peiping had twenty-one years in which the June rainfalls were less than 50 mm. (2 in.), and of these, five had rainfalls of less than 10 mm. (0.4 in.). Half a million people perished by famine in the Hwang ho valley through the droughts of 1920 and 1921, when Peiping had respectively 41% and 38% of the average fall.

In Central China, the average variability is less, but in exceptionally dry years the rainfall may amount to little more than half the average and a severe drought may occur in any month of the year, but in very wet years the annual total may be as much as 50% above the normal and result in catastrophic floods. It is possible for both floods and drought to occur in the same year. In 1931 there was a severe flood in August (Fig. 31), but the region suffered from a drought in the late summer. It is one of the tragedies inherent in Chinese life that the areas most subject to drought and floods include the richest agricultural lands of North and Central China (Plates 111, 112).

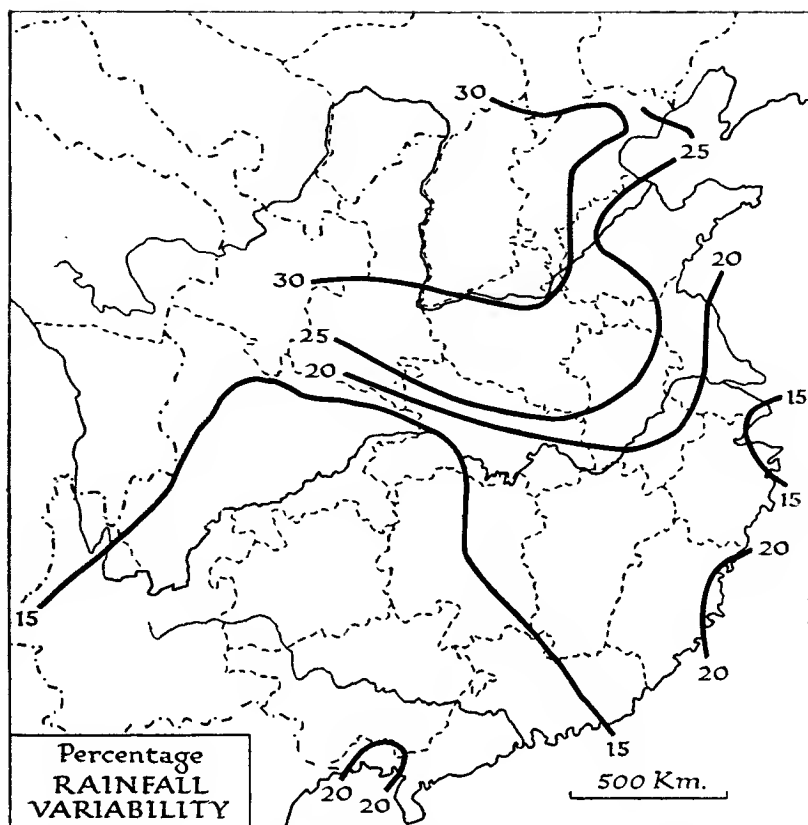


Fig 93. Rainfall variability

Based on Buck, J. L., *Land Utilization in China : Atlas*, p. 21 (Nanking, 1937).

This map represents average deviations from a norm and not the extreme variations which are of great human significance in a primarily agricultural country. The variability is greatest where the rainfall is lowest.

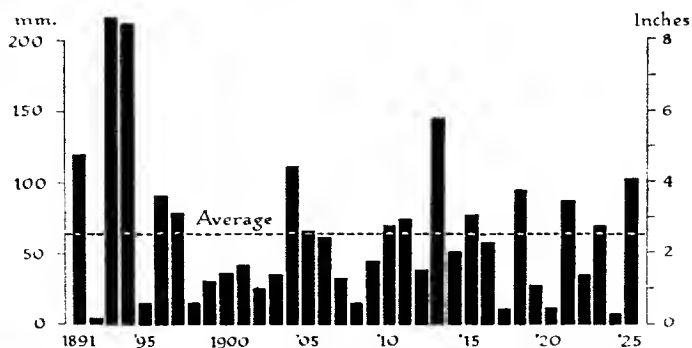


Fig. 94. June rainfall, Tientsin, 1891-1925

Based on Cressey, G. B., *China's Geographic Foundations*, p. 169 (New York, 1934).

This graph gives a better impression than Fig. 93 of the variation in rainfall from year to year at a single station. In 20 years the rainfall was less than the average and in 15 more than the average. The average rainfall was never recorded in any single year.

## WEATHER TYPES

Climate has been defined as average or accumulated weather. The day to day conditions constitute weather and the six charts given in this section illustrate certain weather conditions in the four seasons. They may usefully be compared with maps showing the average conditions or climate (e.g. Figs. 95–100). In the selection of the following six charts the more unusual phenomena have been

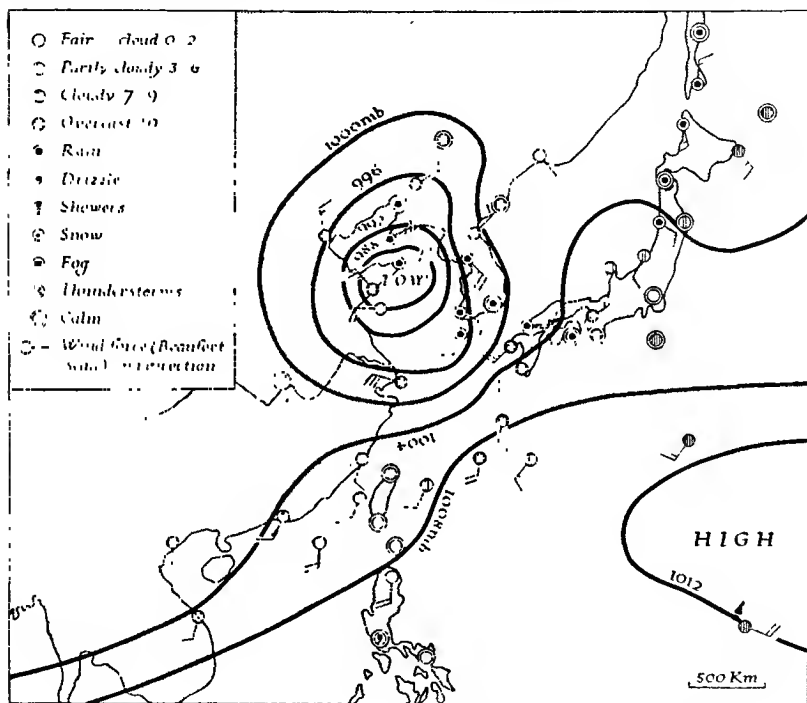


Fig. 95. Low pressure system, 1 July 1931

Based on *Weather in the China Seas*, vol. iii, p. 98 (London, 1938).

avoided, though it will be seen that the movements of depressions and anticyclones are uncertain and probably unpredictable. The accidental element therefore figures very largely in the weather conditions of China.

### Summer

1. 1 July 1931 (Fig. 95). A deep Central China depression is centred between Tsingtao and Weihaiwei. Weihaiwei has a strong

east wind, force 7, with continuous rain. Rain is falling at stations in Korea and the south of Manchuria, with winds of force 4-5. Outside the area covered by the depression there are gentle winds, typical of midsummer, blowing over the Pacific Ocean as a monsoonal indraught. Part of the Horse Latitudes high pressure belt in the Pacific Ocean appears in the south-east of the area shown.

2. 10 July 1931 (Fig. 96). A Central China depression is located to the south of Hankow, where rain is falling. As

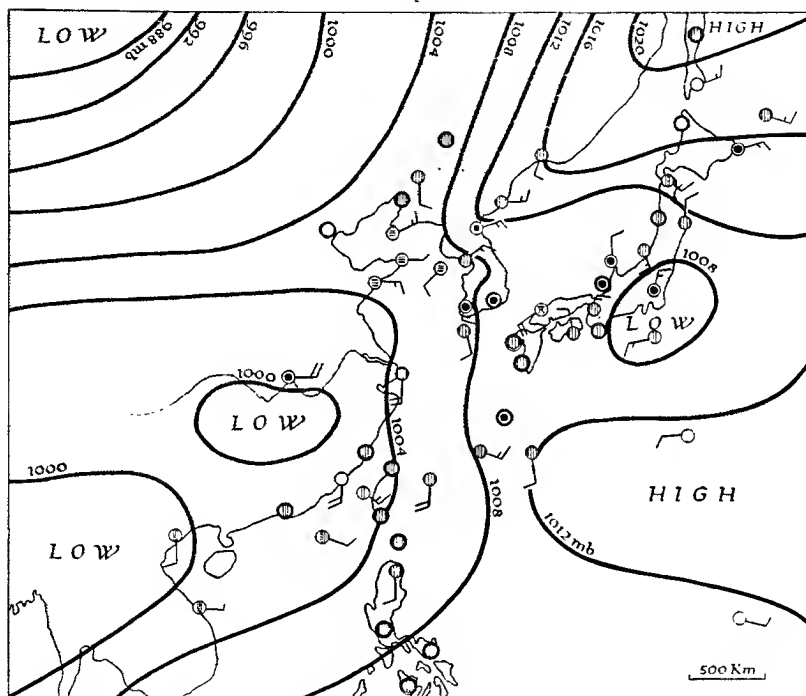


Fig. 96. Low pressure system, 10 July 1931

Based on *Weather in the China Seas*, vol. iii, p. 107 (London, 1938).

noted above, the Yangtze had heavy floods during this month due to the passage of six depressions. (See p. 232 and Fig. 31.) A Siberian depression exists over Siberia and the depression now over Japan, seen over Manchuria on the previous day, may be an offshoot from the Siberian depression. These Siberian depressions influence China only occasionally. The anticyclone over the Pacific is well marked and there is a fairly sharp pressure gradient

giving winds of force 4 along parts of the South China coast. There are cloudy skies here and also in Shantung where morning mist is associated with light easterly winds.

### *Winter*

3. 10 November 1931 (Fig. 97). The continental anticyclone is centred over North China and Mongolia, giving light winds or calms with clear skies and low temperatures. Over Central China and the

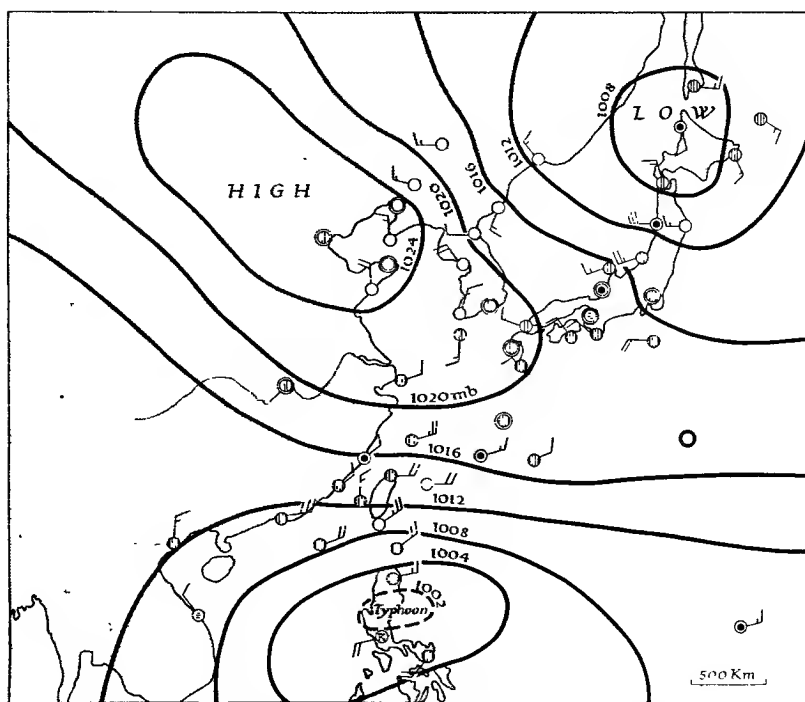


Fig. 97. High pressure system, 10 November 1931

Based on *Weather in the China Seas*, vol. iii, p. 150 (London, 1938).

surrounding seas the winds are stronger, with overcast skies and rain in places. East winds prevail over the sea and north-east winds blow along the South China coast. This is a frequent feature of the winter monsoonal conditions.

Two low pressure systems occur. Over Hokkaido there is a Siberian depression which has moved to its present position from Siberia across Manchuria. A second depression is located over the

Philippines and within it a typhoon exists. This typhoon had originated east of the Philippines. Later, in association with the depression, it moved to the north-west and struck the coast of South China between Hong Kong and Amoy. Here it filled up rapidly and died away. Occasionally typhoons strike the coast of South China in winter but they have generally lost their intensity over the sea.

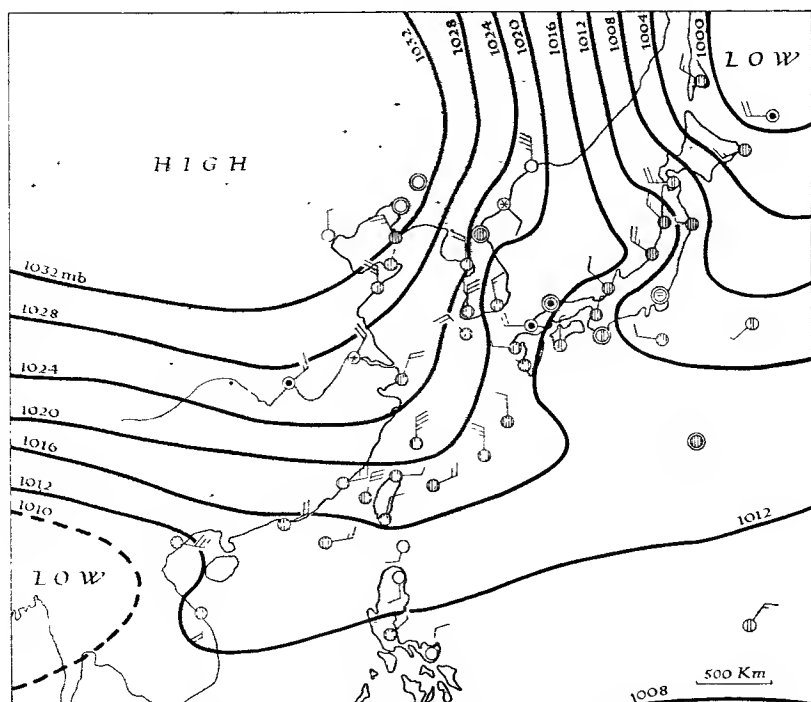


Fig. 98. High pressure over Asia, 18 December 1929

Based on *Weather in the China Seas*, vol. iii, p. 160 (London, 1938).

4. 18 December 1929 (Fig. 98). The depression shown to the east of Sakhalin originated as a Central China depression, probably over the Yangtze valley, and moved over the Sea of Japan to the position shown. In its course it followed almost exactly track III in Fig. 77. The continental anticyclone has spread gradually southwards as the depression has moved away from the coasts and seas of China and Japan. Very high pressures, with extremely cold conditions (temperature of  $-10^{\circ}\text{C.}$  to  $-23^{\circ}\text{C.}$ ), are recorded in the north of China and in south Manchuria. The steep pressure

gradient towards the low pressure system over Burma has caused the development of a strong monsoonal current, especially over the south-east coast of China, where the wind is generally parallel to the coasts. The skies are cloudy or overcast.

Snow and rain falling over the Yangtze provide the first indications of a Central China depression which brought snow to the Yangtze valley and rain to the delta on the following day. This depression

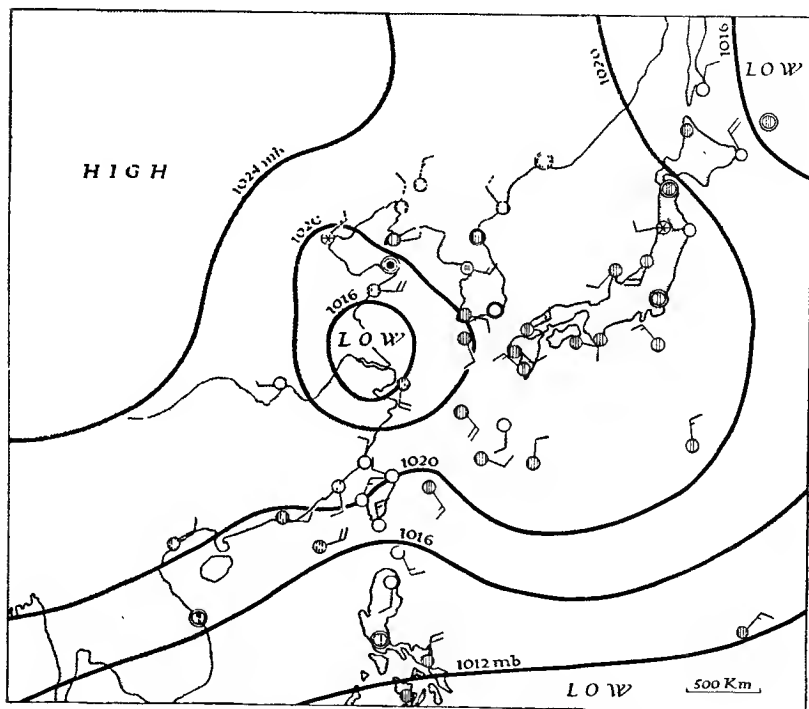


Fig. 99. Low pressure system, 15 March 1933

Based on *Weather in the China Seas*, vol. iii, p. 42 (London, 1938).

was fairly clearly due to mingling of cold Siberian air and warmer subtropical air over the Yangtze. The depression later moved over the south of Japan and the surrounding seas.

### *Spring*

5. 15 *March* 1933 (Fig. 99). The continental anticyclone dominates the interior of Asia but a depression is centred near the mouth of the Yangtze. The depression was not seen in the chart

for the previous day, and it apparently developed over the Yangtze basin. As a Central China depression, it moved across the south of Japan to the Kurile islands. In movement it became deeper, but on 15 March it is seen as a relatively shallow depression. Rain is falling at Chefoo and snow at Tientsin (temperature  $-1^{\circ}\text{C}.$ ). There is calm at Chefoo and light winds with overcast skies elsewhere.

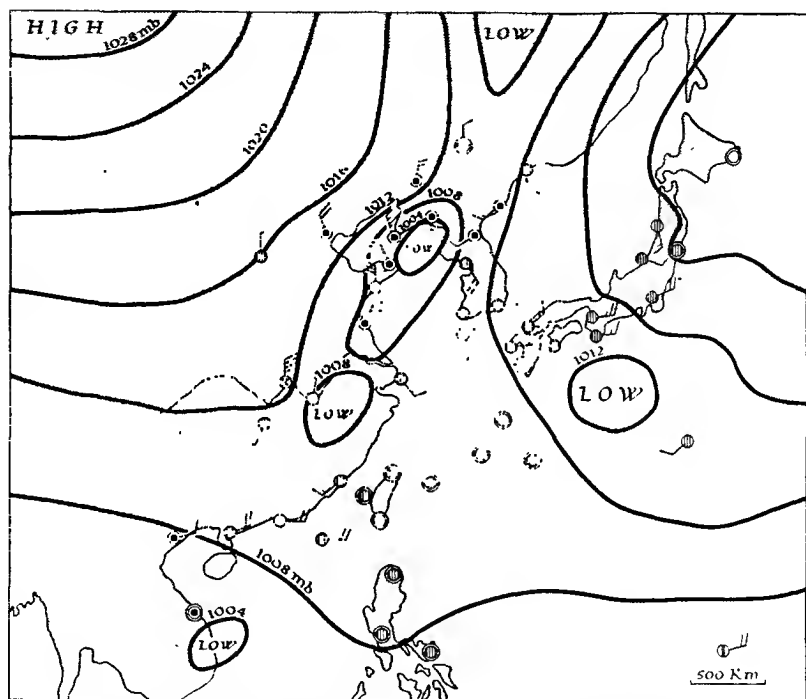


Fig. 100. Low pressure systems, 12 September 1935

Based on *Weather in the China Seas*, vol. iii, p. 129 (London, 1938).

The general wind direction is north-east, the normal trade wind line, but this is reversed in places, probably owing to local atmospheric conditions not perceptible in the isobars.

### Autumn

6. 12 September 1935 (Fig. 100). The winter monsoon is spreading into China; stormy and unstable weather prevails over a considerable area. A complicated system of secondaries is allied to a depression centred over Manchuria. Stormy winds, reaching



force 7, occur in these secondary depressions, in which cold Siberian air is sharply mingled with warm oceanic air. Rain is falling in places and at Hankow a thunderstorm with a wind of force 7 is reported. South China remains very warm with calm or light winds. Winter conditions are invading North and Central China with dramatic results, but South China is as yet immune.

### CLIMATIC REGIONS

The division of China into climatic regions is made difficult by the lack of adequate records and the classification given must therefore be regarded as tentative. One major problem is the virtual absence of records from mountain areas which makes any assessment of local conditions impossible. However, the main lines of differentiation are fairly clear and are indicated on Fig. 101.

China falls into three major climatic regions with a number of sub-regions. The major regions are North, Central and South China, and the sub-regions are given below.

#### 1. *North China*

This region extends from the Tsinling shan-Hwai ho line on the south to the boundary of China Proper on the north. As a whole it shows a steady graduation from fertile agricultural lowlands with an adequate rainfall in the south towards desert conditions in the north-west. The summers are hot (over 20° C., 68° F.) in the whole region, but the winters are cold except in the extreme south. The winters are dry and the monsoonal regime of summer rainfall is more sharply developed than in Central or South China. In winter the cold Siberian air dominates the region, with north and north-west winds. A very limited amount of rainfall is associated with Central China depressions. In summer south and south-east winds blowing from the sea predominate. The subdivision is mainly on a basis of rainfall.

(a) *North China Plain, with Shantung.* The southern boundary coincides with the 750 mm. (30 in.) isohyet and the greater part of the region has over 500 mm. (20 in.) of rain each year. The course of this critical isohyet is a matter of doubt and some authorities place it at the foot of the highlands. The rainfall variability averages 20-30%, but a better conception of its effect is given by the Tientsin averages for July (Fig. 94). Droughts are numerous and at times severe, coming almost every year somewhere in this region. Floods

are an even greater scourge. These are due to the sudden heavy rainfalls combined with various non-climatic factors treated elsewhere (see p. 32).

The winters become progressively colder towards the north, but the summers are warm everywhere, and the range of temperature marks the region as extreme. The growing season is between 200 and 250 days (see Fig. 85).

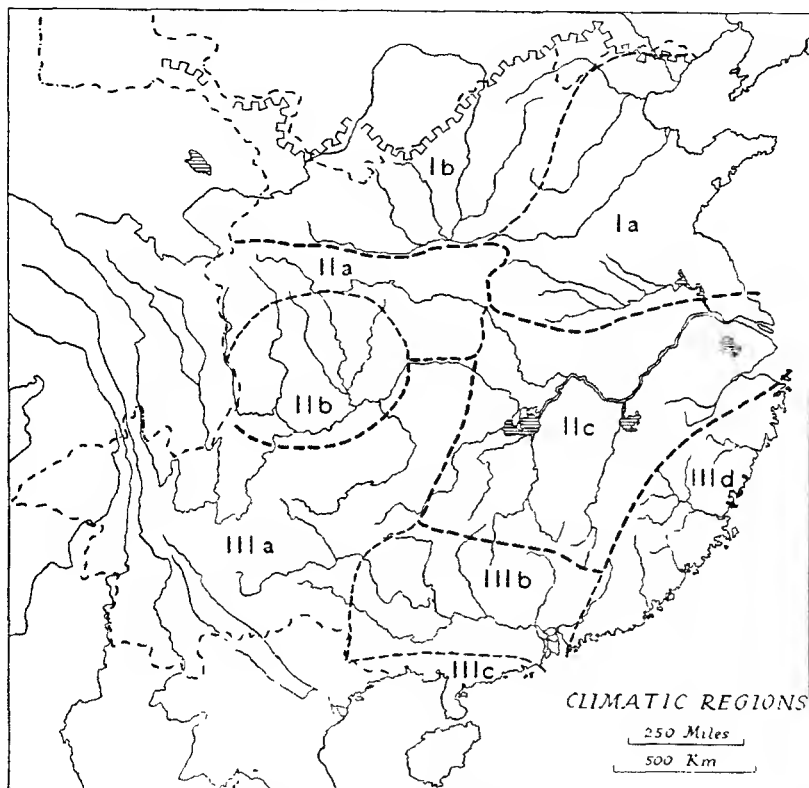


Fig. 101. Climatic regions

This map is an attempt to summarize the regional features of the climates of China as described in the text. The data is inadequate for any rigid scheme, but the major physical divides such as the Tsinling, the Nanling, and the Wuyi shan, appear to be climatic divides also.

(b) *The Loess Plateaux.* This large area has a markedly continental type of climate. The rainfall is everywhere less than 500 mm. (20 in.) and over a large part of the area less than 400 mm. (16 in.). Approximately half the entire precipitation falls in

July and August, with a little in June and September. The winter is dry with occasional falls of snow. This snow moistens the fields and makes spring planting possible towards the end of May. The rainfall variability is over 30% and the area is definitely submarginal as an agricultural area. Droughts are severe and may follow in successive years and floods are not unknown. In the valleys the growing season is about 200 days. The mountainous ridges have cooler conditions throughout the year, although statistics are not available.

The area within the Ordos loop becomes increasingly arid, and the Great Wall marks the approximate boundary between 'the steppe and the sown'.

## 2. *Central China*

This region is defined on the north by the annual isohyet of 700 mm. (28 in.) but is not clearly differentiated on the south where its limit is approximately the 10° C. (50° F.) isotherm for January. The summers are very warm throughout the region, though the presence of large highland areas introduces cooler conditions locally. While the plains are stifling, mountain resorts have more attractive conditions. In general the rainfall increases steadily towards the south, reaching over 1,500 mm. (60 in.) in the highlands.

The monsoonal regime exists in a modified form. In July south and south-east winds predominate, especially near the coast. The month of maximum rainfall is June, but the proportion of rain coming in the summer months is far less than in North China (Fig. 92) and in fact less than 40% over a wide area. The summer monsoonal indraught comes earlier here than in North China, and accounts partly for the development of Central China depressions in spring. In these the warm maritime air of sub-tropical origin mingles with the cold Siberian air. The rainfall in spring is comparatively heavy and there is a smaller but still appreciable rainfall in autumn; no month is rainless and in this the monsoonal climate of Central China contrasts very sharply with most Indian types.

The variability of rainfall is about 20% through the region and there are severe droughts and floods from time to time. Some of the floods are due to typhoons which may bring heavy rains as far inland as Hankow. Others are due to summer rains, which cause a spate of water in the tributaries of the Yangtze. Central China may be divided into three sub-regions.

(a) *The Central Mountain Belt*, formed by the Tsinling shan and the Tapa shan with the mountains surrounding Szechwan on the north. No statistics are available for this area and its chief significance is its frontier character between North and Central China. The northern slopes resemble the barren hills of North China, and the southern slopes have the rich vegetation of Central China. The mountain belt is sufficiently high to provide considerable protection against the winter monsoon winds in the Hankow region, and more especially in the Szechwan Basin.

(b) *The Red Basin of Szechwan* is a particularly favoured area climatically. The cold northerly winds of winter are largely excluded by the protective mountain belt, consequently severe frost is rare and the average winter temperatures are around  $10^{\circ}\text{C}$ . ( $50^{\circ}\text{F}$ .) and in part at least of the area cropping continues through the whole year (Fig. 85).

The summer is hot with temperatures of  $25\text{--}30^{\circ}\text{C}$ . ( $77\text{--}86^{\circ}\text{F}$ .). Szechwan is a humid region with a moderate rainfall, generally about 1,000 mm. (40 in.). The seasonal regime is monsoonal, but the summer maximum is less marked than in other parts of China (see Chungking, Fig. 90), probably because this area is too distant from the sea to receive any typhoonal rainfall. There is a good deal of rainfall associated with depressions in spring and autumn.

So far as is known the variability of rainfall is not great in Szechwan. It must be stressed that a great deal of research is needed on the climate of Szechwan. Though its fertility is justly famous and the main features of its climate are well known, many interesting questions are only partly answered. Fuller work will reveal the significance of the southward exposure of many of the hillslopes, the influence of mountain winds, and the differences between the climate of the hillslopes and the valleys, the two main topographical elements.

(c) *The Central Yangtze Basin, the Delta, and the Hangchow Basin*. In this important sub-region considerable local differences occur. There is a steady amelioration of climate conditions from north to south. In summer the region is very warm everywhere with mean temperatures of  $28\text{--}30^{\circ}\text{C}$ . ( $82\text{--}86^{\circ}\text{F}$ .). The temperature in January varies from approximately  $2^{\circ}\text{C}$ . ( $35^{\circ}\text{F}$ .) in the north to  $8^{\circ}\text{C}$ . ( $47^{\circ}\text{F}$ .) in the south. The prevalence of cool conditions in winter limits the growing season to 300 days or less in the north of the region, but towards the south the growing season

lasts through almost the whole year. These conditions, however, are typical only of the valleys and the uplands are much cooler.

The north and north-east winds of winter are strongly developed at some stations; at Kiukiang north-east winds predominate over all others. At Shanghai and Gutzlaff, the winter monsoon current is from the north and north-east. These winds bring cold conditions and, mingling with sub-tropical air, cause the development of Central China depressions which may bring snow in the winter months and considerable rain in spring. The formation of depressions occurs throughout the year but is least marked in July, probably because the air is then universally warm over China. This may account for the fact that the rainfall is lower in July than in June at most stations in Central China.

### 3. *South China*

South China as a whole has a marked monsoonal regime and is in this way more comparable to North than Central China. The summer is hot everywhere, though slightly cooler on the coasts than in the interior. The highland areas have lower temperatures throughout the year and this gives the Yunkwei Plateau region its individuality. However, almost all the stations have a maximum rainfall in June or July with a definite dry season in winter. At this season the north-east trade winds are dominant on the coast, and so far as is known, in the interior. The temperatures increase from about 8° C. (47° F.) to 18° C. (65° F.) in the extreme south and it is largely on a basis of winter temperatures that the area may be divided into sub-regions.

The rainfall variability is about 15–20% and floods and droughts, though not as frequent as in regions farther north, are not unknown. The worst climate hazards are typhoons which, reaching the coast between the beginning of June and the end of September, may cause considerable destruction and death. As a whole, South China is a sub-tropical region, with an interesting highland sub-region in the Yunkwei Plateau. There are three other sub-regions.

(a) *The Yunkwei Plateau.* Adequate records for this region are lacking but the climate appears to be a more temperate type than elsewhere in South China. The January temperature is generally from 8–10° C. (47–50° F.) and in summer 21–26° C. (70–80° F.). Pronounced local contrasts occur. Some of the valleys are malarial and have a dense growth of tropical plants. The mountains, especially on the west, are snow-capped until

mid-summer. The annual rainfall is about 1,000 mm. (40 in.), increasing steadily towards the mountainous west. The seasonal rainfall is clearly monsoonal, and comes mainly between June and September. The summer is not oppressive and this area is a summer resort for Europeans. The dry season begins early in November and continues until the latter part of April. During this season there is plenty of sunshine, the air is clear and light frosts may occur at night. There is inadequate evidence to show the length of the growing season but it probably lasts for about 300 days.

(b) *The Si kiang valley.* The Si kiang valley is a sub-tropical region with warm winters having mean temperatures from 12–16° C. (53–60° F.). The July temperatures are similar to those farther north, with a mean of 28–30° C. (82–86° F.), but the hot season is longer than in Central China. Cropping is possible throughout the year.

The rainfall shows a marked summer maximum, and the annual total increases steadily from west to east. Wuchow has 1,300 mm. (51 in.), Canton nearly 1,700 mm. (66 in.). The year falls into three seasons. There is a long wet summer with south and south-west winds from mid-April to mid-October, with excessive humidity and considerable heat. Typhoons may cross the coast in this season, but they generally lose their vitality over the land. The summer is followed by a relatively dry winter lasting to the middle of February, after which there is a transition period with muggy weather. Depressions may form in spring and bring some rain to the Si kiang valley.

(c) *The Kwangtung coastal lowland and Hainan.* This is the warmest region of China, with winter temperatures around 16–18° C. (60–64° F.) and summer temperatures of 30° C. (86° F.). There is continuous cropping throughout the year. The distribution of rainfall is monsoonal and the greater part of the annual total falls between June and September. Coastal areas and Hainan island are subject to typhoons and the average annual frequency is about seven. Torrential rain is usually associated with these cyclonic storms. Much of the summer rain is due to sharp thunderstorms, of which there is an average of one hundred each year.

(d) *South-east China.* The climate of this area is in general sub-tropical; the winter temperatures are from 6° C. (42° F.) in the north to 15° C. (59° F.) in the south, but the summer temperatures

are everywhere around 28° C. (83° F.). On the coastal lowlands and in the lower parts of the river valleys cropping is possible throughout the whole of the year. The mountains have cooler conditions but no precise information is available.

The rainfall, though primarily monsoonal in type, does not show the simple seasonal form typical of the Kwangtung coastal lowland and the Si kiang valley. The rainy season is more extended through the year. In spring there are rains associated with depressions and in summer there are monsoon rains with occasional typhoons. These occur between June and September, and in them as much as 100 mm. (4 in.) of rain may fall in a single day. This accounts for the high mean rainfall for August at certain stations. The total precipitation for the year is over 1,500 mm. (60 in.), but there are stretches of coast with drier conditions. Amoy has less than 1,200 mm. (47 in.) though the proportion of the annual total received in each month is similar to that at other stations. Hong Kong has nearly 2,200 mm. (85 in.), but the relative distribution through the year is much the same as at other stations. In such a complicated and mountainous area, with sudden sharp changes in the exposure of coast, such differences in rainfall are to be expected, and here, as elsewhere, considerable complexities will be revealed by an increase in the number of recording stations.

#### BIBLIOGRAPHICAL NOTE

1. There are a number of excellent general accounts of the climate of China in works already noted, including: Sion, J., *Géographie Universelle*, tome ix (*Asie des Moussons*) première partie, pp. 3-21 (Paris, 1928); Kendrew, W. G., 'Climate' in Buxton, L. H. D., *China the Land and the People*, pp. 271-316 (Oxford, 1929); Cressey, G. B., *China's Geographic Foundations*, pp. 60-79 (New York, 1934); Chapman, B. B., 'Climate' in Buck, J. L., *Land Utilization in China*, pp. 101-129 (Nanking, 1937)—the *Atlas and Statistics* volumes of this book collate and map much material from Chinese sources.

2. The official publication of the Meteorological Office, Air Ministry, *Weather in the China Seas*, 3 vols. (London, 1938) presents with numerous maps the available material on the seas, the coastal areas, and the Yangtze valley.

3. The publications of the Zikawei Observatory, Shanghai, of the University of Nanking, and of the National Research Institute of Meteorology, Nanking, supply much useful information. Amongst the more notable are: Chu, Coching, 'Climatic Provinces of China', *Memoirs of the National Research Institute of Meteorology*, No. 1 (Nanking, 1929), and 'A brief survey of the Climate of China', *Memoirs of the National Research Institute of Meteorology*, No. 7 (Nanking, 1937); Chapman, B. B., 'The Climatic Regions of China', *University of Nanking College of Agriculture and Forestry Bulletin*, No. 3 (Nanking, 1933); Gherzi, E., *Etude sur la Pluie en Chine*, 2 vols. and atlas (Zikawei Observatory, Shanghai, 1928); Gauthier, R. P. H., *La température en Chine*, 3 vols. (Zikawei Observatory, Shanghai, 1918).

## CLIMATIC TABLES

The figures available for China are in almost every case for an inadequate range of years. In many cases there are gaps in the records, but the following tables give the most reliable figures available. In Table VII, which covers the greatest number of stations, each place has been ascribed to its climatic region as shown in Fig. 101.

The data in the ten tables given below has been mapped, with supplementary data, in various Figs. of Chapter VIII.

- I. Average monthly temperatures ( $^{\circ}\text{F.}$ ).
- II. Depressions: average monthly and annual totals.
- III. Percentage of winds from various directions.
- IV. Average monthly and annual percentages of relative humidity.
- V. Average monthly and annual cloud amount.
- VI. Average number of days with fog.
- VII. Average monthly and annual precipitation (inches).
- VIII. Average number of days with rain.
- IX. Average number of days with snow.
- X. Average number of thunderstorms.



CLIMATIC TABLES  
TABLE I.—AVERAGE MONTHLY TEMPERATURES

Degrees Fahrenheit

Station	Yrs. Obs.	J	F	M	A	M	J	J	A	S	O	N	D	Mean		Range °F.
														°F.	°C.	
South-east Promontory	29	30.4	31.0	37.4	47.3	56.6	65.0	71.5	75.2	70.2	61.3	48.1	36.0	52.4	11.4	44.8
Chefoo	..	23.5	31.2	40.0	53.0	64.8	73.0	77.8	78.5	71.0	60.4	46.8	35.0	54.5	12.5	55.0
Chungking	..	24	48.6	49.8	57.6	67.5	73.6	78.7	84.3	76.0	67.0	58.7	50.4	56.2	19.0	35.7
Ningpo	..	35	41.8	48.6	58.7	67.5	75.2	82.2	82.4	75.8	56.6	56.0	46.0	62.0	16.6	39.6
Shanghai	..	44	38.0	39.2	46.2	56.2	65.7	73.3	80.3	73.0	63.4	52.0	42.2	59.0	15.0	42.3
Chinkiang	..	35	37.6	39.2	47.3	58.4	68.4	76.5	82.8	84.1	74.4	64.8	41.8	60.7	15.9	46.5
Wuhu	..	36	39.2	40.8	48.4	59.6	69.3	76.8	83.2	74.9	65.7	53.6	43.2	61.3	16.3	44.0
Kiukiang	..	31	40.5	42.2	50.0	62.3	71.5	79.2	85.7	77.0	66.6	55.4	45.4	63.4	17.4	45.2
Hankow	..	29	40.2	42.7	50.4	62.0	71.5	79.8	85.5	76.7	66.6	55.3	44.6	63.4	17.8	45.3
Ichang	..	33	42.2	44.6	52.8	63.7	72.4	79.8	84.2	76.0	66.6	56.2	46.4	64.1	17.8	42.0
Pakhoi	..	34	60.0	58.7	64.8	74.4	81.7	84.2	83.4	82.2	77.6	69.4	62.3	71.8	22.1	24.2
Wenchow	..	28	47.0	52.8	61.6	69.4	76.8	82.6	82.8	78.0	69.7	60.5	50.6	65.0	18.3	35.8
Swatow	..	30	59.0	57.3	62.0	69.2	76.0	81.2	83.4	81.4	75.6	68.0	61.2	71.5	21.9	24.4
Amoy	..	24	58.7	56.4	59.6	67.0	74.5	81.0	84.2	82.5	77.0	69.4	62.0	71.3	21.8	25.5
Hong Kong	..	32	60.5	58.0	63.4	70.8	77.4	81.4	82.2	81.5	76.4	69.3	62.6	72.0	22.2	21.7

Source: Buck, J. L., *Land Utilization in China: Statistics*, p. 7 (Nanking, 1937).

TABLE II.—DEPRESSIONS: AVERAGE MONTHLY AND ANNUAL TOTALS

	Period	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Year
All Depressions	1893-1918	4	4	6	6	6	5	2	1	2	3	4	4	48
	1901-1910	4	4	5	6	6	5	2	under	2	3	3	3	45
	1921-1930	7	8	9	10	10	8	5	2	3	6	7	7	84
Central China Depressions	1893-1924	3	2	3	3	3	2	under	under	under	1	1	2	22
	1901-1910	3	3	3	4	3	3	2	under	1	2	2	2	28
	1921-1930	5	6	7	7	7	6	4	2	2	4	4	5	61
Siberian Depressions	1901-1910	1	under	2	3	3	2	under	under	under	1	2	2	17
			1					1	1	1				
	1921-1930	2	2	2	3	3	2	under	under	1	2	3	1	23

Source : *Weather in the China Seas*, vol. i, part 1, page 53 (London, 1938).

TABLE III.—PERCENTAGE OF WINDS FROM  
VARIOUS DIRECTIONS

	N	NE	E	SE	S	SW	W	NW	Calm
Weihaiwei (12-13 years)									
January ..	25	7	2	2	6	13	14	26	5
April ..	16	9	7	9	17	15	9	12	6
July ..	8	9	11	13	20	18	3	5	13
October ..	26	9	3	5	14	13	8	16	6
Means ..	20	9	5	7	14	14	9	15	7
Nanking (13 years)									
January ..	20	19	11	11	5	8	7	8	11
April ..	11	19	21	17	6	8	4	5	9
July ..	6	13	22	20	10	10	5	4	10
October ..	20	24	18	9	4	3	3	6	13
Means ..	15	19	18	14	6	7	5	6	10
Hong Kong (50 years)									
January ..	29	30	13	4	7	8	2	6	1
April ..	4	6	63	6	7	3	3	3	5
July ..	9	9	14	12	29	22	6	5	4
October ..	16	16	48	8	2	1	2	2	5
Means ..	19	24	16	7	11	12	3	6	3

Source : *Weather in the China Seas*, vol. ii, tables (London, 1938).

TABLE IV.—AVERAGE MONTHLY AND ANNUAL PERCENTAGES OF RELATIVE HUMIDITY

Station	Years Obsns.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean
Weiweiwei	12-13	% 73	% 76	% 77	% 70	% 70	% 76	% 84	% 82	% 75	% 71	% 72	% 74	% 75
Tsingtao	26	69	68	70	71	73	82	89	84	74	67	65	65	73
Tientsin	22	59	56	55	52	54	63	75	76	69	64	61	57	63
Shanghai	62	78	78	78	79	79	84	84	84	83	79	77	76	80
Chinkiang	16	77	77	74	75	76	81	83	81	80	75	76	76	78
Nanking	17	78	78	78	78	78	81	83	81	81	78	78	76	79
Kiukiang	16	78	78	78	77	75	78	76	75	74	73	75	74	76
Hankow	17	75	77	77	77	76	79	78	75	74	75	74	76	76
Hong Kong	50	75	70	83	85	84	83	83	83	78	72	68	69	79

Source: *Weather in the China Seas*, vol. ii, tables (London, 1938).

TABLE V.—AVERAGE MONTHLY AND ANNUAL CLOUD AMOUNT (TENTHS)

Station	Years Obsns.	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean
Tsingtao	26	4.3	4.5	5.2	5.4	5.5	5.3	7.0	5.9	5.2	4.2	3.8	4.0	5.0
Tientsin	22	3.0	2.9	3.6	4.1	4.2	5.0	5.5	5.0	4.1	2.8	2.7	2.4	3.8
Gutzlaff	6	6.7	5.7	6.1	6.5	6.7	7.4	5.7	5.5	6.9	5.4	5.7	6.3	6.2
Shanghai	62	6.1	6.8	6.8	6.9	7.0	7.6	6.3	5.8	6.4	5.7	5.2	5.1	6.3
Chinkiang	8	6.1	6.7	6.9	6.6	5.9	6.6	6.3	5.9	6.4	5.3	4.6	5.2	6.0
Nanking	8	6.5	6.8	6.4	6.6	6.9	7.1	6.9	5.6	6.1	5.0	4.8	5.9	6.2
Hankow	21	5.9	7.1	7.0	6.9	6.7	6.8	6.2	4.8	5.8	5.8	5.3	5.4	6.1
Hong Kong	50	6.4	7.6	8.2	8.0	7.6	7.8	6.8	6.6	6.0	5.1	5.3	5.5	6.7

Source: *Weather in the China Seas*, vol. ii, tables (London, 1938).

TABLE VI.—AVERAGE NUMBER OF DAYS WITH FOG

Station	Years Obsns.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Wei-hai-wei	12-13	0.9	1	1	3	2	3	4	2	0.7	0.5	0.2	1	19
Tientsin	25	2	1	0.2	0	0.2	0.1	0	0.1	0.3	0.6	0.9	0.9	6-7
Tsingtao	5	2	4	5	6	8	12	11	1	0.4	0.6	1	1	51
Gutzlaff	6	7	8	8	9	12	12	3	1	0.3	1	3	5	69
Shanghai	18	2	4	4	3	5	3	1	2	3	5	5	4	41
Chunkiang	4	3	4	2	1	1	0.2	0	0	0.2	2	4	4	21
Nanking	4	3	0.8	3	2	1	3	0.5	0.8	1	3	4	3	24
Hong Kong	50	4	5	9	8	2	1	1	3	2	0.6	1	2	38

Source : *Weather in the China Seas*, vol. ii, tables (London, 1938).

TABLE VII.—AVERAGE MONTHLY AND ANNUAL PRECIPITATION  
Inches

Station	Climatic Region	Years Obsns.	J	F	M	A	M	J	J	A	S	O	N	D	Total ins.	Total mm.
Tsingtao	Ia	35	0.4	0.4	0.8	1.5	1.6	3.4	6.1	5.8	3.3	1.3	0.8	0.6	26.1	662
South-east Promontory	Ia	38	0.4	0.4	0.8	1.6	1.8	3.1	6.5	6.0	3.2	1.3	1.3	0.7	27.1	683
Chefoo	Ia	38	0.5	0.4	0.7	1.0	1.3	2.4	6.7	6.0	3.2	1.3	1.3	0.7	24.4	620
Tientsin	Ia	35	0.2	0.1	0.4	0.7	1.1	2.5	6.9	5.2	1.9	0.6	0.4	0.1	20.1	500
Peiping	Ia	25	0.2	0.2	0.4	0.9	0.8	2.9	10.4	6.0	2.4	0.7	0.3	0.04	25.2	637
Siwantsz	Ib	18	0.1	0.1	0.4	0.4	2.1	2.2	3.6	2.1	1.5	0.7	0.3	0.2	13.7	345
Chungking	Ilb	33	6.5	0.8	1.4	4.0	5.5	7.1	5.6	5.1	5.8	4.5	2.0	0.9	49.2	1,103
Gutzlaff	Ilc	39	1.9	2.4	3.7	3.8	3.3	5.6	3.5	2.6	3.9	2.9	1.9	1.4	36.9	937
Ningpo	Ilc	39	2.7	3.5	4.3	4.6	4.4	7.5	5.0	6.9	7.0	4.3	2.5	1.9	54.6	1,386
Shanghai	Ilc	53	2.0	2.4	3.4	3.7	3.6	7.4	5.9	5.7	4.7	3.1	2.0	1.3	45.2	1,148
Chinking	Ilc	39	1.6	1.7	3.0	3.6	3.6	7.0	7.3	4.8	3.9	1.9	1.6	0.9	40.9	1,040
Wuhu	Ilc	27	2.1	2.3	4.1	5.1	5.0	8.3	6.5	4.8	3.3	3.0	2.2	1.3	48.0	1,219
Kiukiang	Ilc	40	2.5	3.3	5.9	7.1	6.9	9.6	5.6	5.2	3.5	3.8	2.7	1.7	57.8	1,466
Hankow	Ilc	44	1.8	1.9	3.8	6.0	6.5	9.6	7.1	3.8	2.8	3.2	1.9	1.1	49.5	1,259
Ichang	Ilc	42	0.8	1.1	2.1	4.0	4.8	6.1	8.3	6.7	3.9	3.3	1.4	0.6	43.1	1,095
Kunming	IIla	17	0.5	0.5	0.6	0.7	3.7	6.1	9.4	8.2	5.4	3.6	1.7	0.6	41.0	1,040
Canton	IIlb	23	2.0	3.0	3.7	6.3	10.2	10.0	10.6	10.1	4.9	2.4	1.8	1.2	66.2	1,682
Wuchow	IIlb	27	1.2	1.9	3.4	6.7	8.0	7.7	6.6	7.0	3.9	1.4	1.7	1.5	51.0	1,299
Lungchow	IIlb	28	0.7	1.1	1.9	3.4	6.7	8.5	8.8	9.1	5.2	2.1	1.6	0.9	50.0	1,260
Pakhoi	IIlc	38	1.3	1.3	3.0	4.2	6.7	11.5	10.8	20.0	10.7	3.2	1.8	1.9	85.4	2,169
Wenchow	IIId	39	1.9	3.7	4.8	6.0	7.1	10.4	7.8	9.3	8.0	3.7	2.2	1.6	66.5	1,689
Foochow	IIId	36	1.9	3.8	4.5	4.8	5.9	8.2	6.3	4.8	8.4	2.0	1.6	1.9	54.1	1,435
Swatow	IIId	45	1.4	2.5	3.1	5.7	9.1	10.5	7.8	8.3	5.5	2.9	1.5	1.5	50.8	1,516
Amoy	IIId	34	1.3	3.0	3.5	5.0	6.2	7.0	5.2	6.6	4.3	1.9	1.3	1.3	46.6	1,183
Hong Kong	IIId	41	1.3	1.7	2.7	5.3	1.3	15.8	14.0	14.6	9.7	5.1	1.7	1.1	74.3	2,162

Source: Buck, J. L., *Land Utilization in China: Statistics*, pp. 3-4 (Nanking, 1937).

TABLE VIII.—AVERAGE NUMBER OF DAYS WITH RAIN

Station	Years Obsns.	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Weihaiwei	12-13	7	5	5	5	7	8	10	10	7	5	7	6	82
Tsingtao	27	4	3	4	6	7	8	13	11	8	4	4	4	76
Tientsin	22	2	2	3	3	5	9	13	11	6	4	3	2	63
Gutzlaff	39	6	7	10	9	8	9	5	5	7	6	5	5	82
Shanghai	62	10	10	12	13	12	14	11	11	12	9	8	8	130
Chinkiang	39	7	7	10	10	9	10	10	9	9	6	5	5	97
Nanking	20	10	10	13	13	11	15	15	13	13	10	9	8	140
Kiukiang	40	9	11	14	15	14	13	8	9	8	9	7	7	123
Hankow	45	7	7	11	11	11	11	11	6	7	8	5	6	99
Wenchow	41	9	13	16	16	17	16	13	13	12	9	7	7	149
Tungyung	20	6	10	11	10	11	8	5	5	8	8	7	7	96
Foochow	39	6	11	10	10	11	11	8	9	10	5	5	5	102
Hong Kong	50	6	8	11	12	16	21	19	17	14	8	5	5	141

Source: *Weather in the China Seas*, vol. ii, tables (London, 1938).

TABLE IX.—AVERAGE NUMBER OF DAYS WITH SNOW

Station	Years Obsns.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Weihaiwei	21	10	5	3	0.4	0.1	0	0	0	0	0	4	10	33
Tsingtao	11	4	3	0.8	0	0	0	0	0	0	0	0.5	3	11
Tientsin	21	4	2	2	0.1	0.1	0	0	0	0	0	1	3	12
Gutzlaff	5	3	1	0.4	0	0	0	0	0	0	0	0	0.4	5
Shanghai	52	2	3	0.8	0.1	0	0	0	0	0	0	0.2	0.4	7
Chinkiang	8	3	3	1	0	0	0	0	0	0	0	0.1	1	8
Nanking	15	3	3	2	0.4	0	0	0	0	0	0	1	2	11
Hankow	21	3	3	1	0.4	0	0	0	0	0	0	0.4	2	10

Source : *Weather in the China Seas*, vol. ii, tables (London, 1938).

TABLE X.—AVERAGE NUMBER OF THUNDERSTORMS

Station	Years Obsns.	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Weihaiwei	6	0	0	0.2	0	0.2	0.8	1	0.9	0.3	0.1	0	0	4
Tsingtao	23	0	0.1	0.3	0.5	3	5	6	5	1	0.9	0.1	0	22
Tientsin	21	0	0	0	0.4	1	5	5	3	2	0.5	0	0	17
Shanghai	52	0	0.2	1	2	2	3	6	5	2	0.4	0.2	0	22
Chinkiang	8	0	0	1	1	1	3	6	3	1	0	0	0	16
Nanking	15	0.2	0.2	1	2	1	3	6	5	1	0.1	0.1	0.2	20
Hankow	21	0.3	0.5	2	3	2	3	4	3	0.4	0.1	0.1	0	18
Hong Kong	50	0.2	0.2	2	4	4	5	5	6	3	0.7	0.1	0.1	30

Source : *Weather in the China Seas*, vol. ii, tables (London, 1938).



## Chapter IX

### NATURAL VEGETATION

The Flora : General Distribution of Vegetation : North China : Central and South China : Bibliographical Note.

#### THE FLORA

The flora of China is particularly rich and has a large number of endemic species. Many of these were developed in the isolated valleys which are so characteristic of the country. In Europe and North America, the southward extension of the ice-sheets during the Quaternary period reduced very substantially the number and range of species of deciduous and coniferous trees. In the east of Asia the area glaciated, though not exactly known, was substantially smaller. The less hardy trees survived only in the south during the maximum extension of the ice, but colonized areas farther north as climatic conditions improved. In the north of China, the flora is palæarctic and differs little from that of Manchuria and Siberia. The central and western provinces have a vegetation with many Himalayan and Japanese forms; and in the south there are many immigrant species from Burma and Indo-China.

A general review of the Chinese flora gives an impression of considerable wealth and variety. On a map of vegetation regions it is possible to draw only the most general boundaries (Fig. 103), but local variety is the hidden salient feature of the distribution. China lacks the enormous extent of almost untouched natural vegetation characteristic of such areas as Siberia and Canada. Its present vegetation must be compared with that of long settled regions, such as the British Isles, France or the Mediterranean countries. Almost everywhere the hand of man against the forest is seen. No reliable estimate of the area at present forested is available, but it is known to be comparatively small (Fig. 102).

#### *Coniferous Trees*

The higher mountains have areas of coniferous forests not unlike those of the European Alps, but with a distinct red species of larch, and with numerous species of silver fir and spruce. Pine woods are similar in appearance to the *Pinus sylvestris* woods of Europe, but they consist of different species, notably the Chinese

their height. The beautiful ginkgo tree (*G. biloba*) has leaves which resemble the maidenhair fern on a large scale. It has been preserved by gardeners from extinction, especially around temples (Plates 113, 114, 115).

### *Deciduous Trees*

Many deciduous trees are present in the Chinese flora. There are numerous species of oak, elm, chestnut, walnut, poplar, willow and alder, but beech is comparatively rare. Some of these, such as the chestnut and the oak, have evergreen species. These occur from the Yangtze southwards and are found intermingled with such trees as the banyan (*Ficus*), and evergreen magnolias. There are forty species of bamboo, widespread from Central China southwards (Plate 117). Various types of palm exist in the south.

Trees of economic importance native to China include the peach and many citrus fruits. The Chinese were the first to use the varnish tree (*Rhus vernicifera*) from which lacquer is obtained, the tallow tree, the white mulberry on which silkworms feed, the wood-oil tree which yields a substitute for paint, and the tea plant.

### *Ground Flora*

In the ground flora, numerous species of rhododendron take the place of the heath plants of Europe. The rhododendron has its headquarters in China with over a hundred species varying in size from tiny shrubs a few inches high to tall trees. Species of *Primula* and *Gentiana* are almost as numerous. Various shrubs and climbers such as *Clematis*, *Rubus* and *Rosa* are also common. From these and other plants, Chinese gardening has enriched the world. It is said that a botanic garden was established as early as 111 B.C. at Sian for the reception of rare plants from the south and west. Many kinds of roses, camellias, lilies and peonies are due to the skill of Chinese gardeners. The chrysanthemum is derived from two small and inconspicuous plants, and the wistaria is also of Chinese origin (Plate 116).

## GENERAL DISTRIBUTION OF VEGETATION

The distribution of natural vegetation in China reveals the contrast between north and south which has been noted in previous chapters. In China north of the Tsinling shan divide, various types of 'open' vegetation as opposed to forest are developed. These grade from grasses and bushes through increasingly sparse types of grassland and steppe to actual desert conditions in Inner Mongolia. The

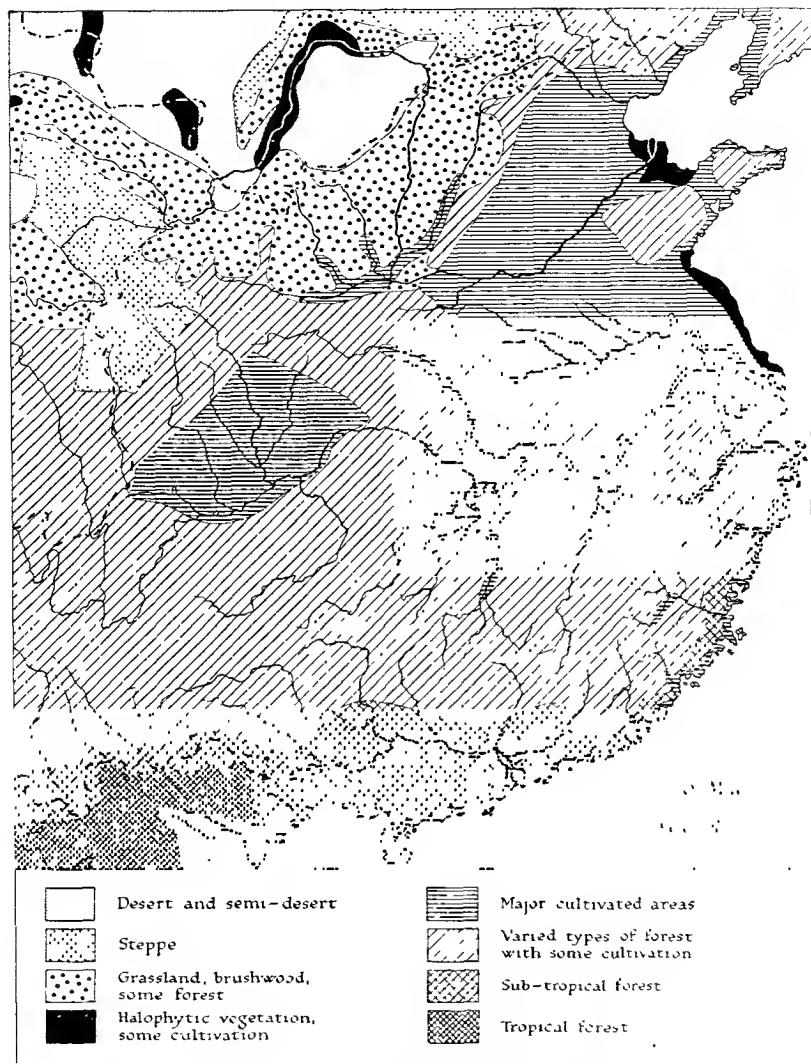


Fig. 103. Natural vegetation and land use

Based on (i) Thorp, J., *Geography of the Soils of China*, p. 47 (Nanking, 1936); and (ii) Cressey, G. B., *China's Geographic Foundations*, p. 91 (New York, 1934).

The natural vegetation has been so modified that little now remains. Sub-tropical vegetation is seen in the south, the area of continuous growth noted in Fig. 85. In the north-west an open type of vegetation suggests the gradual transition to the desert of Mongolia from the fertile and long cultivated lowlands of North China.

hard pine (*P. sinensis*) and the Chinese red or horsetail pine (*P. massoniana*). These are infrequent in the extreme west, and the horsetail pine is found only from the Tsinling shan southwards.

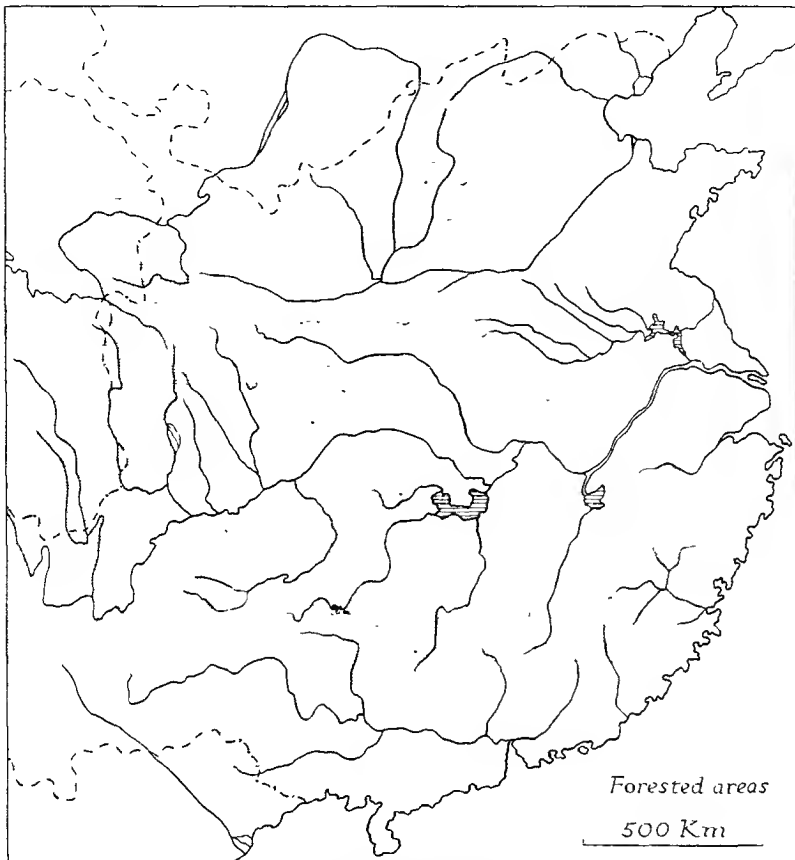


Fig. 102. Forested area

Based on Buck, J. L., *Land Utilization in China : Atlas*, p. 45 (Nanking, 1937).

A relatively small part of China is now covered with forests ; the greatest reserves exist in the extreme west and in some of the more inaccessible uplands of the south. Attention has been drawn elsewhere to the acute problems of soil erosion which have resulted from disafforestation (see p. 202).

China has some magnificent coniferous trees which are unknown in Europe. Of these the most striking is the Chinese fir (*Cunninghamia lanceolata*), which is widespread from the Yangtze southwards. *Cryptomeria japonica*, the peacock pine, is comparable with the giant sequoias of North America, but attains only half

same transition in a north-westerly direction was noted in the soil types which grade through increasingly light types of chestnut earths and give place in Inner Mongolia and within the Ordos loop to grey and yellow-grey desert soils (see p. 174 and Fig. 57).

Two areas in North China have, on account of greater precipitation due to altitude, a type of soil which shows a measure of the podsolization more fully developed in South China; the Shantung brown soils in the uplands west of Peiping and in the Shantung peninsula carry a natural vegetation of coniferous and deciduous forests, of which only small patches now remain. The North China Plain is the largest area of continuous cultivation in the country, and has been so long settled that there is now little trace of the primitive vegetation. Some areas of highly saline soils along the coast, in the North China Plain and near the Hwang ho in the Ordos loop area, have a halophytic (salt-loving) vegetation.

The Tsinling shan divide shows in its vegetation the most northerly extension of southern forms, and the combined influence of a richer vegetation and higher rainfall causes podsolization of the soils. Evergreen broadleaved forest is characteristic of Central and South China, with a growing proportion of sub-tropical forms towards the south. The Nanling forms a vegetational divide comparable with the Tsinling, between the Yangtze basin, which has a highly mixed type of vegetation, and the dominantly sub-tropical Si kiang valley.

Alluvial lowlands occur along the Yangtze, focusing upon the delta and the Central Basin, but there are also significant areas of settlement in mountain valleys or on the slopes of hills as in Szechwan. The coastal fringe from the Yangtze delta to the Si kiang delta is of limited extent but very densely peopled. There are restricted and discontinuous areas of lowland in fertile valleys of the South-Eastern Uplands.

Primitive forest has been gradually restricted to small areas, generally in remote mountain fastnesses. Lowlands have been settled; terrace farming has been pushed up the hillsides; upland crops have been cultivated on higher land, and forests cleared for wood and by the periodical burnings still characteristic in many parts of China. There are groves of trees around temples and along roads, but here various trees not native to China may figure prominently. The widespread destruction of forests has led to serious soil erosion (see p. 192) and the study of reconstruction in China should include these problems if the natural resources of the country are to remain undestroyed (Plate 108).



Plate 113. Horse-tail or red pine (*Pinus massoniana*)



Plate 114. Chinese fir (*Cunninghamia lanceolata*)



Plate 115 Coniferous forest

Mainly Chinese silver fir (*Abies delavayi*) at 5,000-6,000 ft. in the Omei shan, western Szechwan.

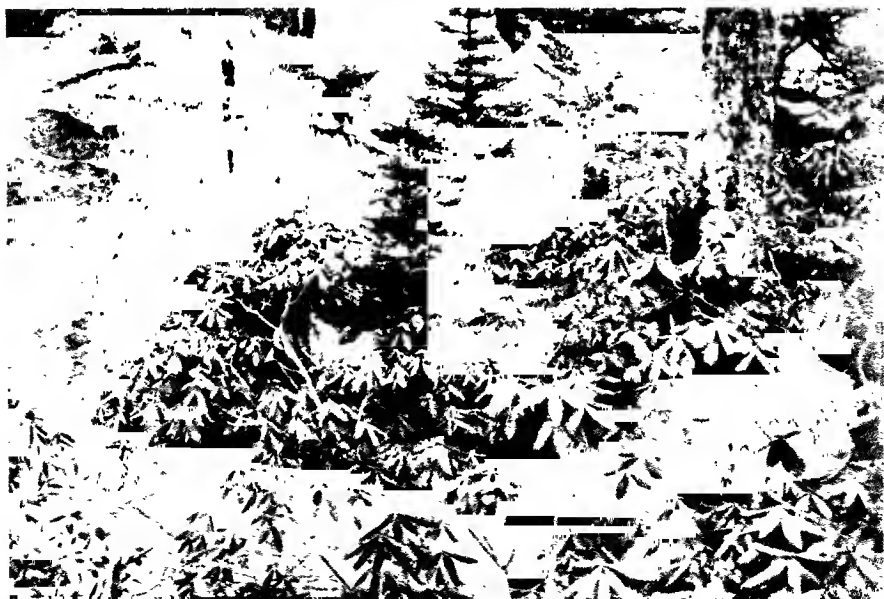


Plate 116 Rhododendrons

Rhododendrons as undergrowth in coniferous forest at 10,000 ft. in the Sino-Tibetan Borderland.

## NORTH CHINA

*Halophytic Vegetation*

Unreclaimed areas of saline and highly alkaline soils occur around the Gulf of Pohai, on the coastlands to the south of Shantung, and also in isolated and generally small patches in the plain itself. The vegetation of these areas includes halophytes, very prominent among which are several genera of the family *Chenopodiaceæ*, annuals or small shrubs, with fleshy leaves and a high salt content. There is also a salt-tolerant vegetation, which may extend to neighbouring non-saline lands including, for example, species of *Artemisia*.

The halophytic and salt-tolerant vegetation is harvested annually as a fuel for household cooking and for salt manufacture. Boat-loads of this unusual harvest find their way from north Kiangsu as far south as the Yangtze river. In the North China Plain, farmers use some of the saline soils for the production of a halophytic shrub called *Lienliu*, which has long willowy branches very suitable for making baskets. Reeds growing on less saline marshes are harvested and used for many purposes such as sunshades, awnings and matting. Reeds are also used for temporary and semi-permanent houses and the roofs of all house-boats. When the rains have leached out the greater part of the salts, reeds grow, and after several years of reeds the land may be planted to agricultural crops. The reclamation of saline areas is slow and difficult, for such lands must be dyked and drained, and the salt gradually removed with rain or irrigation water. Many of the cotton soils of east Kiangsu are reclaimed saline soils.

*Types of Woodland*

In the settled agricultural areas of the North China Plain, which cover approximately two-thirds of the area, there are various trees on grave plots and in the villages, e.g. arbor vitæ (*Thuja orientalis*), pines, poplars and willows. Groves of willows and poplars along the streams are especially prominent on the sandy and saline soils of the river plains to the south-east of Peiping, where they supply enough timber for export to other regions. In some places, plantations of trees are grown for special purposes, such as acacias for pit props. The natural vegetation of this plain probably consisted of grasses, reeds, halophytes, scattered willows and poplars.

The hills of Shantung and the Peking Grid have scattered areas of deciduous and coniferous forest, but consist mainly of grassy



eroded hills and barren stony mountains. The deciduous trees include oaks, elms, chestnuts, maples and the pagoda tree (*Sophora japonica*), the conifers include pines, arbor vitæ and junipers. In second growth thickets the Chinese date (*Zizyphus jujuba*), is very common and usually interspersed with grass. Deciduous trees are more frequent on the deeper soils of low hills and alluvial fans, often associated with arbor vitæ. Pines are generally found on thin soils and among crags of more or less barren eroded mountains, but are also planted on some of the deeper soils of the foothills and alluvial fans.

Groves of poplars, willows, European locusts and elms have been planted in the valleys as a source of wood and a means of controlling river erosion. Some of these trees regenerate naturally and therefore form semi-natural vegetation, but as a rule forests do not regenerate themselves in this region. They have been destroyed by a population in desperate need of timber and fuel. The long dry season makes it difficult for young trees to gain a foothold, and the vicious process of soil erosion has begun. Water runs off rapidly from the disafforested and unprotected surface after rain. The water table is lowered by deep erosion gullies, and rapid evaporation from the unshaded surfaces keeps the soils too dry for easy forest reproduction. Several species of grasses have occupied the land and used the moisture of the upper soil horizons.

The areas of loess and derived soils have mostly been cultivated or overgrazed for a long period, but the natural vegetation maintains a precarious foothold in gullies and gorges. It is doubtful whether the loess was ever widely forested, and probably the tree-cover was general only on the higher mountains and hills which extend above the general level of the loess deposits and on steep slopes where the loess cover is thin and seepage of moisture would be adequate for tree growth. The surviving forest areas consist usually of a mixture of thorny shrubs, including the Chinese date or jujube tree, with patches of mixed deciduous and coniferous forests, including pines, arbor vitæ, cedars and oaks. Carefully-tended groves of trees occur around temples, and include the arbor vitæ, the pagoda tree, poplars, pines and occasional cedars.

### *The Transition to Desert*

The differences of vegetation due to aspect are well marked in north-west China. The southward-facing or *adret* slopes receive more insolation than the northward-facing or *ubac* slopes. The

higher evaporation on *adret* slopes under semi-arid conditions results in a lighter type of vegetation. Where *adret* slopes are covered by short-grass vegetation the corresponding *ubac* slopes have long grasses and brush; where the *adret* slopes are covered by tall grasses and brush *ubac* slopes have a forest vegetation. On the higher mountain tops the rainfall may be adequate for the development of forests on both hillsides, but on the lower slopes forests occur only on the north-facing or *ubac* slopes.

The Great Wall has been noted as virtually the boundary between 'the steppe and the sown'. Within the Ordos loop it approximates closely to the limits of desert soils and sand dunes, upon which vegetation is scanty or even absent altogether. The alluvial areas along the Hwang ho are largely saline, and include some cultivated areas, but they lie in Inner Mongolia. Kansu province carries the Middle Kingdom along the road to Sinkiang through the valleys and foothills of the Nan shan. The mountains have vegetational features similar to those of the Loess Plateaux. In the valleys and on the edges of the Mongolian desert there are patches of alluvium, some of which is calcareous and provides locally important areas of considerable fertility. The saline alluvium supports a halophytic flora eloquent of the transition to the desert conditions of Inner Mongolia (Plate 27).

## CENTRAL AND SOUTH CHINA

### *General Features*

The Tsinling shan forms a great natural vegetational divide, reflected by the contrasts in climate and soil types. As shown in earlier chapters, areas of plain and lowland are much more restricted in South China. The North China Plain passes southwards into the Yangtze delta, which is connected by valley lowlands with the Central Basin. These areas have alluvial soils, and are closely settled by cultivators of both rice and wheat. The problem of their natural vegetation is therefore of academic interest only.

The Red Basin of Szechwan is very different, consisting as it does of small areas of lowland along the rivers and hillsides partly terraced for cultivation of rice and other crops.

From all the lowlands of Central and South China valleys carry tongues of alluvial land into the uplands, which are more significant in extent than the lowlands. One may note in passing that the character of the soil in these lowlands depends ultimately upon

the erosion of the surrounding mountains, which in its turn is largely controlled by the natural vegetation and human activities in afforestation or agriculture. It has been shown elsewhere (see p. 202) that the systematic war waged upon the forests in Central and South China has opened the way to the widespread destruction of many hillsides, and at times caused devastating landslides and avalanches which have menaced the lowlands.

In the Tsinling shan, the natural vegetation consists of deciduous and coniferous forests similar to those on the hills of the Shantung Uplands and the Loess Plateaux, but with much denser growth. Some remnants of the original forest remain in the Tsinling shan, which is now a region of grassy hills with only occasional trees and clumps of forest. New growth springs up fairly rapidly on the richer and deeper soils. On the thin but fairly rich soils of the steep mountain sides, the vegetation is mainly deciduous, with species similar to those farther north, but others in addition. Occasional specimens of various broad-leaved trees find their most northerly extension in this range. On the shallow soils of the high mountains and on the very poor and acid soils of the low hills in the southern part of this region, pines are very common. Among them the horsetail pine (*Pinus massoniana*) is widespread and a valued source of fuel. It may be a natural growth, but is more usually planted by villagers as a forest crop (Plate 113).

In much of Honan and Anhwei, grass has taken the place of forest and is cut, with young bushes and trees, for fuel each year. The fuel gatherers cut off the tops of the young trees and dig the roots as well. In some areas, the grass is burnt in the autumn and thus all young trees are effectively prevented from establishing themselves. The areas of natural forest become increasingly infrequent from west to east, where the vegetation consists of grass with scattered patches of forest. The valley and basin areas have little natural vegetation of importance. Trees have been planted along the streams by the farmers and there are many grasses and shrubs along the paths and banks of the rice lands.

### *The Red Basin of Szechwan*

In the Szechwan Basin, practically all the valley lands and a large part of the hills are used for cultivated crops, and much of the remaining land is planted with forests of pine and cypress. Bamboos occur in thickets and there are some palms. On the higher hills there are many deciduous trees mixed with the pines and dominant

in places. Oaks are widespread, and on the hills toward the western edge of the region the *Nanmu*, a valuable evergreen broad-leaved hardwood comprising several species of laurels, is common, but not dominant. Common banyans, evergreen broadleaved trees belonging to the genus *Ficus*, though probably not native, are frequently found in this region, planted for ornamentation and shade, and as objects of worship. The evidence of soil development suggests that this long-settled region was originally forest, but it is difficult to assess the part played by man in the development of the present woodlands. Many areas in this basin are 'badlands', or denuded and gullied country stripped virtually bare of vegetation by erosion.

The mountains on the western side of the Szechwan Basin have several vegetational zones marked by characteristic trees and crops. The warm temperate zone extends to about 2,000 ft., and is highly cultivated, with rice as the chief summer crop and with wheat in the winter. The chief trees are cypress, pine, bamboos, palms, oranges, and species of *Aleurites*. Wood oil is obtained from two species of *Aleurites*, of which *A. Fordii* (the tung-oil tree) is the more northerly form and *A. montana* (the wood-oil tree) is the more southerly form. The oil is used for many purposes, and especially for articles needing waterproofing, such as paints for outdoor use, lanterns, umbrellas and windows, and also for the adulteration of better oils. The tallow trees are two in number, a *Rhus* (*R. succedanea*) and a Euphorbiacea (*Sapium sebiferum*—sometimes referred to the genus *Stillingia*).

From about 2,000 ft. to 5,000 ft., the temperate zone has evergreen vegetation chiefly of laurels, holly, pines, including *Cunninghamia*, and some oaks. This region is largely cultivated and the crops include maize, sweet potatoes and rice, which reaches its altitudinal limit at about 4,000 ft. There are many tea plantations in this zone. From about 5,000 ft. to 10,000 ft., a cool temperate type of vegetation occurs. There are mixed deciduous trees and shrubs, with rhododendron and conifers. Wheat, maize and potatoes are the chief crops. Above lies the sub-alpine zone from 10,000 ft. to 11,500 ft., in which wheat and barley are the staple crops. There are magnificent coniferous forests, with many varieties of spruce, larch and also rhododendron. The alpine zone is reached with the tree limit at about 12,000 ft., and on the borderlands of China and Tibet there are moorlands, heaths and alpine meadows with many flowers, which are occupied by nomadic Tibetans (Plate 119).

*Mountain Forests and Grasslands*

Around the Szechwan Basin, the rolling to mountainous plateau lands of Kweichow, eastern Yunnan and western Kwangsi have dense coniferous and deciduous forests with much grassland and some evergreen broadleaved trees. The natural richness of the vegetation in this area is probably due to the markedly humid climate characteristic of these mountains and plateaux. The soils are rarely dried out and moisture is adequate for herbs and trees. Areas of undisturbed vegetation are rare, but natural regeneration of the forest takes place more readily than in regions farther north. In the Tapa shan range of the Szechwan-Hupeh-Shensi border, and in the mountain complex south of the Yangtze river, the former forest cover included a very large number of different types of coniferous and deciduous trees. Spruce, firs, hemlock and *Cunninghamia* are very common on the higher mountains, with many different kinds of deciduous trees. On the rolling and hilly lands deciduous trees are dominant in the undisturbed forest areas, and among them oak, chestnut and sweet gum (*Liquidambar formosana*) are very common. On the Kweichow plateau, a large part of the hilly land has been partly disafforested and is now covered by tall grasses (Plate 79).

A similar type of vegetation is developed on the higher mountain peaks of western Fukien and eastern Kiangsi and probably in various other mountain regions of southern China. Forests are composed largely of *Cunninghamia* and pines, with large plantations of bamboos, especially along the streams. *Cunninghamia* makes a dense cover over much of the ground, and where the forests have been cut there is an attempt at systematic planting by the villagers. Western Fukien and eastern Kiangsi normally produce large yields of timber, and lumbering is the chief occupation of the people in some districts (Plate 118).

The remaining area from the Yangtze valley to the Si kiang consists largely of mountains with brown and grey-brown podsollic soils and red earths, some of which are very heavily podsolized. Natural forests exist only in more remote and thinly settled regions, and on some sacred mountains. The natural vegetation was probably a mixture of coniferous and deciduous trees, with some broadleaved evergreen trees, which become dominant on the more fertile brown and grey soils. The most productive forests are in the mountainous areas, with a high humidity and precipitation and thin young soils. These regions are now used for the production of



Plate 117 Bamboos

A grove of bamboos at Nanking, showing the effects of a recent typhoon.



Plate 118 Scattered pine forest and bamboo jungle

Dense bamboo jungle often mixed with other trees is characteristic of the vegetation of South China.



Plate 119 Alpine meadow with coniferous trees

Characteristic of the lofty mountain ranges of west China. The large plants are 'horse' rhubarb (*Rheum alexandrac*).

regular crops of *Cunninghamia* and bamboo, as well as pines, deciduous and broadleaved evergreen trees. Most of the lower hills have been cleared by fuel gatherers, or by burning off the grass and brush each year, until many of the old red earths are so impoverished that they will scarcely produce the hardy horsetail pine, which makes such slight demands upon the soil.

Burning ultimately results in complete disafforestation, and in many parts of central and southern Kwangsi, the present vegetation consists of various species of tall coarse grasses, of little value except for fuel and as pasturage during the younger stages of growth for water buffaloes and other cattle. On some of the strongly acid disafforested red soils of South China, especially in Kwangtung and Kwangsi, coarse ferns cover the soil and are used as fuel by the people. The valley lands of this region are given to the cultivation of rice and some upland crops. Many grave plots are partly covered by shade trees among which sweet gums and camphor are very common. Camphors, which are very common in villages and around them, are held in veneration by the people, and so have been protected for centuries. There are some magnificent camphor trees in Kiangsi and Hunan; in the west of Hunan camphor trees are cut and floated down the Yuan kiang. Palms and citrus fruits reach their general northern limit in this region.

### *Sub-tropical Vegetation*

In the Si kiang valley and along the coastal fringe of south-east China, the vegetation becomes more definitely of a sub-tropical type. In this region, broadleaved evergreen trees dominate the landscape and are mixed with pines, deciduous trees and bamboo. Pine trees are more frequent on the older red earths, and on some of the poor thin soils of the mountain sides. On the denuded hills of this type, coarse grasses or ferns have monopolized the soil. Rice is the dominant crop in this region, but citrus fruits, sugar cane, bananas and other tropical and subtropical fruits are also grown. In many parts of Kwangtung and Kwangsi, especially along navigable rivers, forest crops are raised on the hills and mountains. For commercial purposes, the most important tree is the fir, especially *Cunninghamia*, followed by the pine and also including rosewood and camphor. Formosa was the main source of camphor for China until it was ceded to Japan in 1895, since when the principal centres of the industry have been in Fukien and Kiangsi, as well as western Hunan. Camphor trees are widely



distributed in the warmer parts of China and there are in the west especially in Yunnan, large camphor forests as yet hardly exploited. In Kwangtung and Kwangsi there is a large production of red pines which are floated down the Si kiang in huge rafts for use as fuel in Canton and Hong Kong.

#### BIBLIOGRAPHICAL NOTE

1. There is no single systematic survey of the vegetation of China, but the following general accounts will be found useful: Thorp, J., *Geography of the Soils of China*, pp. 43-65 (Nanking, 1936); Buxton, L. H. D., *China the Land and the People*, pp. 22-39, 93-134 *passim* (Oxford, 1929).

2. Other works and articles dealing with the subject include: Newbigin, M. I., *Plant and Animal Geography* (London, 1936); Shaw, Norman, *Chinese Forest Trees and Timber Supply* (London, 1914); Wilson, E. H., *A Naturalist in Western China*, 2 vols. (London, 1913); Hu, H. H., 'Recent Progress in Botanical Exploration in China', *Journal of the Royal Horticultural Society*, vol. lxiii, pp. 371-9 (London, 1938); Lee, S. C., 'The Ecological Distribution of Chinese Trees', *Peking Natural History Bulletin*, No. 9 (1), pp. 1-6 (Peiping, 1934).

## Chapter X

### DISEASES AND HYGIENE

*Medical Organization.*

*Diseases Common to all Countries :* Small-pox ; Scarlet Fever.

*Water-borne Diseases :* Cholera ; Typhoid Group of Fevers ; Dysentery.

*Insect-borne Diseases :* Plague ; Paratyphus ; Sand-fly Fever ; Kala-azar  
Typhus ; Relapsing Fever ; Malaria ; Filariasis ; Dengue.

*Endemic Infectious Diseases :* Leprosy ; Tuberculosis ; Syphilis.

*Helminthic Diseases :* Ascariasis ; Ankylostomiasis (Hookworm disease) ; Schistosomiasis ; Clonorchiasis ; Fasciolopsiasis ; Paragonomiasis.

*Poisons :* Of Animal origin ; Of Vegetable origin.

*Some Hints on the Preservation of Health.*

*Bibliographical Note.*

#### MEDICAL ORGANIZATION

The medical organization of the Republic of China was formed under a Ministry of Health in the year 1929, but its status was later reduced to a National Health Administration under the Ministry of the Interior. At the beginning of the present Sino-Japanese conflict (1937), a Minister of Health was again appointed, but the service reverted to a National Health Administration about a year later. In 1940 this was placed directly under the Executive Yuan. It is evident from these many changes that the position has hardly yet become fully stabilized.

From its inception, the National Health Administration has especially stressed the importance of preventive medicine and is now looking forward to a comprehensive system of State medicine. The following quotation from the Director, Dr P. Z. King, outlines the proposed plan which is being put into force as far as this is possible under war conditions. He writes :

For the promotion of rural health a hsien (county) health system has been worked out and adopted as an integral part of the hsien administration. This system provides a health centre for each hsien, a district health centre for each district (a hsien usually has four or five districts), a health station for each town, village or group of villages, and a health worker for each 'pao' (an average of 100 families).

The hsien health centre is provided, besides the health function, with a twenty to forty bed hospital, a laboratory, and a mobile clinic. The district health centres and health stations have a clinic and the health workers are provided with a first-aid outfit. It is expected that this system, when universally adopted throughout the country, will provide a solid foundation for the State medical service.

With this aim in view, the National Health Administration has subsidized the provincial health authorities in the form of medical personnel and medical supplies for the development of local health organizations.

Three model hsien health centres are being established in each province for the purpose of demonstration.\*

In addition to this proposed scheme, the Administration has set up Highway Health Stations as a war-time measure, and has organized anti-malarial and anti-goitre campaigns in the province of Yunnan where both these diseases are very prevalent.

The National Health Administration has been so fully occupied with problems of preventive medicine that curative medicine has had to be neglected, but the mission hospitals have done yeoman service for China in this respect. The first of these hospitals was founded in Canton in 1835, and this was followed by their establishment all over the country. Indeed, some two-thirds of fully-organized hospitals in China are mission hospitals. Their service to the country during the present war has been of enormous value ; and, though many have suffered damage more or less serious, they have been able to stand up against the tide of invasion, and to continue their work in the occupied areas where they alone could function.

Finally, there is a Chinese Medical Association, demanding a high standard of medical ethics, and combining in the most harmonious manner all those doctors, Chinese or foreign, who are seeking to promote these standards. The Association took over the *Chinese Medical Journal*, originally started by medical missionaries more than fifty years ago, and has brought the *Journal* up to a standard which compares well with the national journals of other countries. It issues this *Journal* both in the Chinese and English languages.

In view of the present difficulties in obtaining drugs, but also with future needs in mind, a Central Pharmaceutical Manufacturing Company has been established for the manufacture of drugs, utilizing native raw materials. The National Epidemic Prevention Bureau, formerly at Peiping, was noted for its excellent supplies of biological products ; it has been re-established in Free China and is able very largely to meet the requirements of the whole country.

Medical educational facilities in China were first developed by the combined efforts of the various missionary societies, which

\* King, P. Z., 'The Chinese National Health Administration during the Sino-Japanese Hostilities' in Madame Chiang K'ai-shek's *China Shall Rise Again*, pp. 152-3 (London, 1941). Since this was written, several more hsien health centres have been started.

began medical work in that country well over a century ago. Starting as a union of neighbouring hospitals for the education of Chinese assistants, these efforts culminated in a few excellent medical colleges, on one of which was based the well-known Peking Medical College of the Rockefeller Foundation. Later, the Ministry of Education developed its own medical schools. These have suffered greatly in the present war, but have been concentrated temporarily in Kunming, Kweiyang, Chungking and Chêngtu, where excellent work is being carried on. The future will undoubtedly see a great development of medical schools in China, though the question of whether they should be for two grades of medical practitioners has not yet been finally settled.

### DISEASES COMMON TO ALL COUNTRIES

Certain diseases are common to all countries and will only be briefly mentioned. Measles, chicken-pox, whooping cough, mumps, glandular fever, diphtheria and cerebro-spinal meningitis differ little from the same affections in the West and call for no comment.

*Small-pox* is universal in China and is of a severity now never seen in England. The lack of any system of isolation makes its spread certain. The writer has seen a Chinese woman die of confluent small-pox on a small river steamer, and her cabin filled with another family a few hours later, without any attempt at cleaning, much less disinfecting. Children with well-formed pustules can often be seen in the streets. Vaccination is efficient but should be repeated every two years. The Health Administration is attempting this on a large scale, and already the incidence of this disease is rapidly decreasing.

*Scarlet Fever*, like small-pox, is of a severity now very rare in our country. It causes a heavy death rate in northern China. Its distribution is of very great interest and illustrates the effects of climate on the nature and spread of disease. It is common and severe in North China; is less common and much less severe in Central China; and it disappears entirely in South China. The great port of Hong Kong has had frequent introductions of scarlet fever but has never had an epidemic. When the great highland plateau of Yunnan in the extreme south-west, about 6,000 ft. above sea level, is reached, however, climatic factors again change, and here the disease reappears and epidemics may be very severe.

## WATER-BORNE DISEASES

*Cholera*

Water-borne diseases form an important group in China, and cholera is the most devastating of them all. Cholera figures in the earliest accounts of disease in China, and references to it go back to over 2000 years B.C. In more recent times, the heaviest epidemic was the one of 1820-21, spoken of as the year of the advent of epidemic Indian cholera into China. This swept from the south over practically the whole country. Since then it is doubtful if the disease has ever been completely absent from some part of the country. Epidemics spread rapidly from the south, up the coast, and more slowly inland by the overland trade routes. Another quick line of advance by water, however, is by the Yangtze river to the far interior. In recent years the number of epidemics has been greatly reduced, and the area covered by each has become much smaller. There have been, however, severe outbreaks during the Sino-Japanese war, though reliable statistics of these have, naturally, been scanty. Enormous supplies of cholera vaccine were provided both by the Chinese Government and by gifts from abroad, while the Japanese have made wholesale inoculations in occupied cities. Preventive inoculation has proved itself a very valuable help even during these times of famine and war. One example of this is very striking. The Red Cross was applied to for supplies of vaccine for a mission refugee camp of 600 persons for women and children in a city on the banks of the Yangtze river. At the time its supplies were very limited and it could send enough for only half the camp. Cholera attacked the area and appeared in the camp. Of the half inoculated, only one was attacked, and he survived. There were numerous cases, and over twenty deaths, among the uninoculated.

Rivers, streams and wells are the greatest sources of infection in China, and the disease will persist until there is an efficient public health control of water supplies.

*Typhoid Group of Fevers*

Typhoid and the paratyphoid fevers are probably very common in China, but there are no reliable figures of their incidence. In recent years there have been severe epidemics in the coastal ports, especially in Amoy. The remarkable thing is not that typhoid fever should be common, but that it should not be far more common, especially in the villages. Everywhere, especially in the rural

districts, the close proximity of wells and latrines suggests a universal infection, but this is not so. There is, however, some reason for thinking that typhoid may be common in China in infancy and the adult population thereby to some extent protected. The course of the disease does not differ materially from typhoid in the west; in some years hæmorrhage and intestinal perforation seem to be much commoner than in others. Paratyphoid C is more frequently met with in China than in Britain.

### *Dysentery*

No part of China is free from dysentery. It is naturally more prevalent in the tropical and sub-tropical south, but it is a common infection even in the north. Sources of water supply are so often suspect that it is surprising that the disease is not even more frequent. A typical picture is that of a large village in South China where the main well is in the principal graveyard in which burials are still being made.

The two types of dysentery, amœbic and bacillary, are to be found everywhere, but there are no reliable statistics about the relative frequency of the two. In some places, and in some years, amœbic dysentery is much more common than bacillary; but the relative frequency seems to differ in the same place in different years without any evident reason. On the whole, however, the amœbic type seems to be the more common in the rough proportion of about two to one.

Amœbic dysentery carries with it the liability to other amœbic diseases, of which liver abscess is the most common. Emetine is, however, now in pretty general use with a greatly decreased incidence of liver abscess.

## INSECT-BORNE DISEASES

### *Plague*

Plague, which is a flea-borne disease, has been endemic in southern China for centuries, and it has been suggested that the province of Yunnan may possibly be the cradle of the disease. With more, but not conclusive, evidence it is believed that the last great pandemic of the disease spread from this province. Here, again, is a disease whose manifestations are greatly affected by climatic conditions. Bubonic plague, with an occasional case of pneumonic and septicæmic plague, is the typical form in the south; here, however, the pneumonic cases never develop into epidemic proportions. Bubonic plague also arises from endemic centres in the north,

but these give rise to pneumonic cases which take on a separate epidemicity of their own, and which form the most universally fatal of all epidemic diseases. Over 60,000 people perished in the great epidemic of 1917-18, when the disease, starting in Mongolia, spread to all the provinces of northern China. Epidemic pneumonic plague has, however, never spread south of the Yangtze river; while the southern epidemics of bubonic plague have never spread north of the river.

Plague is essentially a disease of rodents—rats in South China and tarabagan in North China—and it is carried to man by fleas from the infected animals. Epidemics of plague in man are always preceded by epidemics among the rodents. While it is some years since a severe epidemic occurred, endemic foci continue to exist, especially in parts of Fukien in the south, and in west Shansi in the north. From these, limited epidemics frequently arise.

The disease is often preceded and sometimes followed by local enlargement of lymphatic glands, with little or no fever, ending either in absorption or suppuration of the affected glands. In bubonic plague, the buboes are found in the following order of frequency—the inguinal glands, the axillary glands and those about the jaw and neck. In some epidemics there are skin lesions, either as scattered hæmorrhagic bullæ or as a profuse purpuric eruption. The lesions in pneumonic plague vary from a typical pneumonia to an apparently simple bronchitis. Transmission of this form of plague is direct from man to man. Preventive measures are by prophylactic inoculation of killed cultures of *Bacillus pestis* which have proved efficient. In endemic areas, houses should be periodically cleaned and all rat holes filled with cement.

### *Paratyphus*

Paratyphus (murine typhus) is a form of typhus fever which is distinguished by little else than its relative mildness and low mortality. Unlike typhus itself, it is flea-borne from rat fleas; and, as far as present knowledge goes, has a localized distribution in China, especially in the Yangtze river valley. The temperature chart, skin rash and course closely resemble those of a mild attack of true typhus.

### *Sand-fly Fever*

The geographical distribution of this disease has not been fully worked out, but it appears to be fairly common in the summer in

North China as far south as the Yangtze river ; and it is doubtful if it ever occurs much farther south. The local population where this disease occurs, appears to have developed a considerable immunity to the fever, which mainly affects visitors from the south.

Symptoms include headache, flushed face and injected conjunctivæ and general pains as in influenza. Vomiting and diarrhœa may occur. The febrile period may last from two to four days.

### *Kala-azar*

This disease was first described in China in 1905, though undoubtedly it has a much longer history in the country. The disease is relatively common, but is patchily distributed over the greater part of China north of the Yangtze river, and is present less frequently in the provinces immediately south of the river and in those bordering on it. Farther south than this it has not yet been proved. In certain areas there is a very high infection. A mission hospital north of the Yangtze had at one time over 4,000 cases under treatment in a single year.

The disease is characterized by a commencing fever of from three to six weeks, during which the liver and spleen are enlarged. Subsequently, there are irregular bouts of fever and massive enlargement of the spleen. Hæmorrhage from mucous membranes is common, and *cancrum oris* occurs in young children. Untreated, kala-azar is fatal either from asthenia or intercurrent disease in a period of about two years. Diagnosis is made by the finding of the Leishman-Donovan bodies in punctures from the spleen, liver or lymphatic glands. There is a characteristic and very marked leucopenia.

Treatment is by the intravenous injection of salts of antimony. The organic salts, such as neostam and stibosan, are the most effective and the least toxic, but their high cost makes their bulk use almost impossible in a country like China. Tartar emetic (potassium antimony tartrate) is in common use, and with care and constant supervision its use is free from danger in the majority of cases.

### *Typhus*

It is very difficult to give any accurate picture of the distribution of louse-borne diseases in China. In normal times typhus is common and very severe in North China, coming south as far



as Shanghai, but it is absent, at least in epidemic form, in the southern provinces until the high tableland of Yunnan province is reached. Here again it assumes an epidemic form. It must be remembered, however, that floods, war and famine are so closely associated with these diseases that any attempt to define their distribution at the present time can only be futile.

Typhus is an acute and, in some epidemics, a very fatal fever, characterized by a short onset of about two days. Its symptoms are an intense headache, frequently nausea, congested face and eyes, heavily coated tongue, and frequently epistaxis. The temperature rises rapidly to about  $105^{\circ}$  and remains high, the patient passing into a typhoid state. A measly, often becoming purpuric, rash appears about the fifth day, especially on the abdomen, and this then spreads over most of the body, and persists for about a week. Diagnosis is confirmed by Weil-Felix reaction, positive about the seventh day. The temperature falls, usually by crisis about the fourteenth day. The mortality may be 60% or higher, and convalescence is usually very slow. There is no specific treatment. The best of nursing is essential.

### *Relapsing Fever*

Relapsing fever has roughly the same distribution as typhus, except that it seems to be less common in North China, and much more common in Central China. It is rare in the southern provinces, but, again, in Yunnan, epidemics of great severity with a very high fatality rate may occur.

It is a disease characterized by a short preliminary fever ending in crisis about the fifth or sixth day, followed, after four days' apyrexia, by a fresh attack of fever of the same type, and again by further relapses. Three or four of these are common, but a much larger number have been recorded.

The patient is suddenly seized with a rigor, giddiness, vomiting and headache. Temperature rises to  $105^{\circ}$  F. or considerably higher. Spleen is enlarged, jaundice is usually present but varies greatly in amount. The temperature falls on the fifth or sixth day by crisis. The corkscrew-shaped organism, a spirochete (*Sp. recurrentis*), is present in large numbers in the blood, and diagnosis is usually easy if the blood is taken at the right time, that is on the third or fourth day of the disease. It is rare previous to this and disappears as the crisis is approaching and is absent between the relapses.

Treatment by intravenous injection of salvarsan or neosalvarsan 0.3-0.9 gm., is specific. Care should be taken not to administer the drug when the crisis is approaching or grave toxæmia may ensue. The mortality in China is about 6% (see, however, p. 276). Pregnant women almost always abort.

When speaking of louse-borne diseases in China it must be remembered that these diseases are carried by the body and clothes louse and not by the head louse. There is a definite seasonal incidence which would seem to be dependent on this fact. This is well illustrated by an enquiry in Shanghai on the incidence of relapsing fever. It was believed that the infection was frequently caught by riding in rickshas. The explanation was shown to be that padded and often heavily infected sheepskin coats were worn by ricksha pullers in the winter. The coats were never removed by night or day, and they became infested with lice. When the warmer weather of spring came, the coats were thrown aside during work, or were tucked under the ricksha seats. The lice then sought some warmer situation such as the clothing of passengers, and relapsing fever became prevalent. Later, when summer itself came, the coats were put away until the next cold season and the epidemic of relapsing fever came to an end. While this may be only a local example, it probably illustrates a principle which is common to all louse-borne disease in China.

### *Malaria*

The distribution of malaria in China had been fairly well determined a few years ago, and the following points summarize the position at that time: (1) It was absent from north-west China; (2) it was severe in the lower Yangtze valley, and extended along the south-east coast, reaching its saturation point in Formosa, Hainan and Tongking; (3) it was very severe in south-west Yunnan, especially towards the Burma border; (4) its incidence was singularly low in Hunan province, although conditions there seemed very favourable for the disease. But, however true these statements were at the time when they were published, subsequent events leading to the wholesale evacuation of population right across China, and to the marching of masses of infected soldiery through every province, have certainly altered the distribution of the malignant form of malaria. Hunan province has definitely become a heavily infected area, and severe forms of malaria are now to be found much farther north than formerly.

All three forms of malaria—Quartan (*Plasmodium malaricæ*) with rigors every fourth day, Tertian (*P. vivax*) with rigors every other day, and Subtertian, pernicious malaria (*P. præcox*) with continuous fever, are common in China. The first two are the ordinary types in the north; while the third becomes common as one travels south, and is the most frequent type in the areas of high incidence given above.

It is hardly possible to enter here into the details of the malarial attack, but a few points should be stressed. The diagnosis by blood examination is not always as easy as might be expected. In areas where malaria is universal, a certain immunity is acquired and the examination of blood films may call for a prolonged search before the plasmodium is found. The splenic index (percentage of enlarged spleens) is quite useless in regions where schistosomiasis or kala-azar is common, as most of the children may have enlarged spleens from these causes. Attacks of malaria may simulate other diseases, and especially nephritis.

The treatment of malaria should, however, be stressed, though unfortunately opinions differ rather strongly on the methods and drugs in common use. Malaria is mosquito-borne by mosquitoes of the *Anopheles* type, which, with few exceptions, are night fliers. Complete screening of the house with suitable wire netting to exclude mosquitoes, is a solution of the malaria problem, provided that constant care is taken about the maintenance of screens and the guarding of exits. The figures relating to the mortality from malaria among Japanese soldiers in Formosa are very striking. Deaths from malaria in 1897-1900, before any of the barracks were screened, were from 17% to 20%; in 1903, after screening had been thoroughly effected, they were only 0.7%. When screening is impossible, well-fitting bed mosquito nets at night, kept in proper repair and properly adjusted, are essential.

Great differences of opinion occur as to the value of drug prophylaxis. It seems that when the infection is light, that is where the number of bites from mosquitoes in the right stage to convey malaria is small, prophylactic treatment may be of considerable value, but it is useless when there is an overwhelming infection. Prophylactic treatment is given in the form of 5 grains of quinine once a day or larger doses at longer intervals, say, 15 grains once a week. For the actual treatment of the disease there is now a choice between quinine and synthetic products. As the latter, however, are all very high priced, quinine is likely to

continue to be the drug for bulk use at present. But there are wide differences of opinion as to the dosage and route of administration. Sir R. Ross has stated that 8 grains of quinine a day prove as effective in reducing fever and parasites as much larger doses, up to even 100 grains a day. Sir P. Manson-Bahr advises 30 grains as a maximum, and for most infections 20 grains. Larger doses are certainly most undesirable, and something between Ross's minimum and Manson-Bahr's maximum seems best.

As regards route of administration there is again the conflict between oral administration, intramuscular injection and intravenous injection. The writer is entirely opposed to intramuscular injection on the grounds of the much slower absorption of quinine as compared with oral administration. The only excuse for its use seems to him to be persistent vomiting, and in such cases probably intravenous injection is desirable. Oral administration should be in the form of a solution and is often much more effective if combined with magnesium sulphate. Intravenous injection should be the rule in all comatose cases and in persistent vomiting; 10 grains of quinine hydrochloride in 10 c.c. of water given very slowly. The most important of the synthetic drugs are plasmoquinine compounds, especially useful in dealing with relapses of simple Tertian malaria, and atebirin for Subtertian malaria.

### *Filariasis*

The infection is carried by a mosquito of the *Culex* type, usually *Culex pipiens* in China. The infected mosquitoes convey, by their bites, nematode worms to the lymphatic system or connective tissues, where they develop and produce living embryos (microfilariae) in the blood or tissues. The presence of filaria in the body does not necessarily cause disease or inconvenience to its host; and its nightly discharge of embryos into the bloodstream does not as a rule affect the patient in any way. Two conditions are, however, directly associated with filariasis: (1) Inflammatory troubles, and (2) conditions dependent on blocking of the lymphatics. The pathology of the first of these is still obscure. In the second case, the obstruction is probably caused by an injury to the parent worm leading to premature discharge of the unhatched ova. These being some five times the diameter of microfilariae, block the smaller lymphatic channels and cause obstructive varices. Especially where the dependent parts of the body are involved, a lymph stasis occurs in the whole member, e.g. the scrotum or the leg. There

often follows a superimposed septic infection leading to a series of erysipelatoid attacks, ending in an elephantoid condition of the affected member.

Under inflammatory conditions may be noted fever—often mis-named elephantoid fever. This begins with or without a rigor, lasts some four to six days and is usually accompanied by tenderness in some lymphatic region. Other manifestations are lymphangitis, erysipelatoid inflammation, dermatitis, cellulitis and abscess. The more important conditions due to lymphatic obstruction are varicose groin glands which may increase to the size of a man's fist, lymph scrotum with some general increase in size, exaggeration of the natural rugosities and occasional lymphorrhagia from vesicles on the surface of the scrotum. Chyluria and occasional chylous ascites are also found.

The most important complication, however, of filariasis is elephantiasis. Lymph stasis leads on to solid œdema, and subsequent attacks of erysipelatoid inflammation give rise to a general and enormous thickening of the subdermal tissues, while further lymph stasis is increased by the dependent position of the parts most frequently involved. These are especially the scrotum, the leg and the vulva.

The scrotal tumours are the largest, varying usually from 5 to 50 lb. in weight, but the largest recorded weighed 224 lb. The largest tumours have a narrow drawn-out neck of attachment and may reach almost to the ground. The leg, where this is affected, may be enormously enlarged to as much as 24 in. round the ankle. Operation on these large elephantoid tumours is a serious matter, to be undertaken only after very careful preparation.

The diagnosis of filariasis is usually simple. *Microfilaria* are eel-like worms, easily seen in a fresh blood preparation. They are only found in the blood at night, the number rapidly increasing to a maximum about midnight. The *microfilaria* are also to be found by puncture of lymphatic varices and in lymphorrhagic discharges. They are usually absent from the blood in cases of well-developed elephantiasis.

The distribution of filariasis in China has been fairly thoroughly worked out. The infection is not found north of the Yangtze river valley, but is found sporadically along both its banks and those of its tributaries, decreasing in frequency as one ascends the river. From the mouth of the Yangtze, extending south along the coast, there is a belt some fifteen to twenty-five miles broad and the major

portion of the disease is found in this coastal belt. It also extends to a greater or less degree along the banks of all the rivers to the Tongking border. The incidence is strikingly irregular even in the regions most affected. Thus about 10% of the inhabitants of Amoy harbour microfilariæ, while inland at Changpu 25% of the general population are affected.

### *Dengue*

Dengue is a specific and very highly infectious disease attended commonly by a skin eruption and rheumatoid pains but very varied in its form. It periodically invades South China, but spreads north only during the hot season. The infection is by an ultra-microscopic parasite conveyed by a mosquito, probably *Aedes aegypti*. As many as 90% of the inhabitants of a city may be attacked in one epidemic. The true mortality is nil; but, of course, it may prove the fatal determining incident in other acute or chronic diseases.

The disease begins with a sudden rise of temperature to 103° or 105° F., pulse rapid, tongue furred and prostration profound. After two or three days there is a sudden remission, but on the fourth or fifth day the temperature rises again and a bright red, measly rash appears. The fever falls again in about twenty-four hours and the rash begins to fade. With the recurrence of the fever joint and bone pains are common and may persist long after the disease has disappeared. Atypical forms of the disease are common and an initial rash—an erythematous rash particularly of the face—is not infrequent. No treatment will cut short an attack.

## ENDEMIC INFECTIOUS DISEASES

### *Leprosy*

This is one of the oldest diseases of China, dating back to at least the sixth century B.C. Popular feeling about lepers has varied extraordinarily in different parts of the country and even in different localities in the same province. Thus in southern Fukien there is a common proverb which is good evidence of the little fear of infection—‘Sleep in the same bed with a leper but do not be neighbour across the street to a man with itch’. On the other hand, in the northern part of the same province lepers are regarded with the utmost dread, and are driven out of the homes. Among certain of the tribespeople of the extreme west of China, the fear of the disease is so great that lepers are burnt alive if rich, and buried alive if poor. This may be an ancient superstition which has died out

in the more civilized parts of the country, but which persists in isolated areas ; there is, for example, a comparatively recent case of a leper being buried alive in a country district of Kwangtung.

Of the true incidence of leprosy in China, or in any other country where it is endemic, little can be said. The fact is that leprosy closely resembles tuberculosis in many of its features, and especially in the fact that probably every inhabitant of an endemic area harbours leprosy bacilli, though the proportion that develop the disease may be small. As in tuberculosis also, the heaviest rate of infection is in young children, though this infection may remain dormant for years. It is equally impossible to determine the number of active cases of leprosy in any large endemic area, for the disease is quite inconspicuous in its early stage and very easily hidden, while the social consequences of being known to be a leper are so crushing that it is not until concealment is impossible that the bulk of the lepers become known as such. This is doubly tragic, as it is in the early stage of the disease that treatment is most successful, and it is these early and concealed cases that are often the most infectious. The victims with terrible deformities of face, hands and feet, who are most dreaded by their neighbours, are not as a rule highly infectious.

The causal organism of leprosy closely resembles the bacillus of tuberculosis ; so closely indeed that it is only the inability to culture the former on artificial media or to transfer it to experimental animals that certainly distinguishes the two. Leprosy is strictly a human disease.

Its distribution in China is mainly in the south and west. But the northern province of Shantung is an exception to this, for here heavy infection is present in many areas. Leprosy is to be found in all the provinces bordering on the Yangtze river except Szechwan, where it is rare except in the far west. South of the Yangtze, the incidence increases to a maximum in the provinces of Kwangtung, Kwangsi, Kweichow and Yunnan. It is also very prevalent in the north-western province of Kansu and beyond into Tibet. Leprosy is a rural rather than an urban disease.

The method of conveyance of leprosy is quite uncertain, but it may be through scratched bites of bed-bugs, fleas, etc., or through the scratching of scabies lesions. Despite popular ideas, infection with leprosy is not easily acquired, at least by adults, and never by casual contact. It is certainly conveyed by the wearing of a leper's clothes, and by common use of bedding and possibly by prolonged

contact of any kind. But, like tuberculosis, it is seldom conveyed from wife to husband or husband to wife.

At one time it seemed as if leprosy was largely confined to rice-eating countries, but this is far from being correct. It is, however, very definitely related to the lack of some essential vitamin in the food, and it is certain that the disease is associated with poor food and housing. As these improve the disease will disappear as it has done from England.

Leprosy begins as an inconspicuous, usually reddish spot on the face, limbs or trunk, often on the buttocks, and may be confined to this for an indefinite period. It may, indeed, progress no further than this, and may die away leaving a white, depressed and insensitive spot. As the disease advances, any part of the body may be attacked and it is especially notable in the face and limbs. The striking feature of leprosy is that it attacks the nerve trunks, probably starting in the nerve endings in the skin, and spreads from these to the main nerve trunks which become swollen, tender and painful. All the symptoms of leprosy are due to this selective action on the nerves. The nerves of the areas affected are destroyed; this results in a wasting of the tissues, and in thinning and even absorption of the bone, and in a liability to septic infections in the affected areas. The sensation to pain is lost over the whole affected parts, with the result that a leper becomes insensitive to injuries and burns. The total result is that ulcers form on the skin; fingers and toes are lost, even feet and hands may drop off, the eyes may be irretrievably damaged and the whole person may be revoltingly disfigured.

Little can be said here about treatment but it should be insisted that segregation, however desirable in kindness to advanced cases, is useless in the prevention of the spread of leprosy. On the one hand, the raising of economic standards of the people will eventually, and completely, solve the problem. On the other hand the segregation of children born to leper parents as soon as possible after birth is both desirable and effective. Treatment of the disease, once developed, is by chaulmoogra oil and its derivatives. Prolonged treatment of early cases holds out considerable hope of complete recovery.

### *Tuberculosis*

Tuberculosis in all forms is rampant throughout China. It is one of the most serious existing menaces to public health. It



seems to take an especially heavy toll of the student class, and many of the most promising boys and girls in schools and colleges have had their careers cut short by tuberculosis, especially of the lungs.

The disease is equally prevalent in the north, in the centre and in the south of the country. In the first of these areas, the huddling together for the sake of warmth on the heated platforms (*k'angs*), with the absence of any proper ventilation, is an important factor. In the south, the sleeping of the family in a single bed under a common mosquito net effectively limits the circulation of fresh air, and so is largely responsible. In Central China, both conditions are often present.

Unfortunately, the schools are in many cases little healthier than the homes. Overcrowding is the rule rather than the exception, and dark ill-ventilated classrooms are all too common. There is no subject on which the stirring up of a health conscience is of more importance than on the subject of tuberculosis. Almost at every stage of life the habits of the average Chinese tend to the development and spread of this scourge.

### *Syphilis*

No figures of any value are available for the distribution of syphilis in China. It seems, however, to be pre-eminently a disease of the large cities, whereas the incidence in the country places generally has been small. The province of Kansu is an exception; here, it has been stated, the disease is widespread, and some of the worst cases come from among Tibetans. There are, however, reasons to fear that the distribution of syphilis is being steadily equalized all over the country owing to the ravages of the armies both during the civil wars and during the present Japanese invasion.

It is doubtful whether the frank lesions of primary and secondary syphilis differ at all from the disease in other countries, except that the primary lesion is apt to suffer from serious exacerbation from concurrent septic infections; and that the secondary rash is apt to be more severely marked. Tertiary lesions are universally more severe than those now seen in western lands.

Extragenital primary sores are not very rare on the breast, the lip or elsewhere, and syphilis is not very rare in young children, where one or both parents are infected, and where infection is probably caused by the common use of bowls, chopsticks and other utensils.

Tertiary manifestations of syphilis are particularly severe, especially in the form of gummata and bone affections. A form of gangosa, due to syphilis, with complete destruction of the nasal bones and part of the palate, followed by contractions distorting the face, can occasionally be seen. On the other hand neuro-syphilis, though not very rare, is much less common than in this country.

It should be added that gonorrhœa is widespread and especially severe in the ports and large cities.

## HELMINTHIC DISEASES

### *Ascariasis*

Helminthic infections are extraordinarily common, and those dealt with here are the most frequently encountered. Ascariasis results from infection with *Ascaris lumbricoides*, the common round worm, found in every country, but particularly prevalent in China. It may almost be said to be universal. At some period in the life of a Chinese, especially during youth, round worms are harboured, and few foreigners escape if their stay in China is prolonged. In shape, size and appearance, the round worm has a general resemblance to the earth worm, and is from 6 to 10 inches long. The normal habitat of the worm is the small intestine. An average number of worms in the intestine is from twenty to thirty but enormous numbers may be present and a case is recorded where 500 were passed in a single day. Cases of obstruction in which the intestine was blocked with masses of round worms have been described.

The eggs are swallowed most often with fresh vegetables, but do not develop at once into the adult forms in the host's intestine. Upon hatching, the larvæ burrow into the walls of the intestine and enter lymphatics and venules. Thence they pass through the portal vein, vena cava, heart and lungs and are swallowed again into the intestine where they finally develop to the adult size. The egg is of large size,  $0.06 \times 0.04$  mm., light to dark brown in colour with granular contents and a well marked corrugated shell. They are easily seen in a diluted smear of fæces under the microscope.

The worm usually gives rise to no symptoms, and its presence is realized only by the passage of one or more live worms in the stool. It may, however, cause general symptoms of discomfort, pain and indigestion. Children in the east so suffering should always be examined for worm eggs. In rare cases, especially of

tuberculous ulceration of the bowel, the parasite may worm its way into the peritoneal cavity and give rise to a fatal peritonitis. In cases also of gunshot wound of the abdomen the presence of ascarides forms a very serious menace, pieces of worms and whole worms being scattered through the peritoneal cavity.

Treatment is by santonin, and there is great difference of opinion about dosage. Santonin is a poison producing yellow vision, headache, nausea and giddiness if absorbed. It should always be accompanied by an aperient to hasten its course through the bowel where it is not rapidly absorbed. Small repeated doses of 1 grain with calomel is a favourite treatment, but personally the writer prefers a full dose of three to five grains added to  $\frac{1}{2}$  ounce or more of castor oil—the dose not to be repeated for a week and then only if ascaris eggs are still being passed in the stool.

### *Ankylostomiasis (Hookworm disease)*

Hookworm infection with the two nematode worms *Ankylostoma duodenale* and *Necator americanus* is found in every province in China, but in the northern provinces it is quite negligible as a source of disease. The farther south one goes, the higher becomes the infestation percentage, and in parts of southern China and Formosa it becomes a matter of very serious importance. Here the infestation rate is about 40%, and about 10% of these suffer from well-marked hookworm disease.

The male forms are about 8 mm. long and the female about 12 mm. long and they are dirty white in colour. The eggs are about the same size as those of the roundworm but are colourless, very thin-shelled and contain a segmented ovum. Passed with the stool, an embryo rapidly develops and in two or three days escapes from the shell and finally develops into a filariform larva. This larva is capable of piercing the human skin, gaining the blood stream, thence reaching the lungs and finally the duodenum and jejunum where it attaches itself to the wall of the intestine and grows to adult size. It causes marked anæmia by blood extravasation from the intestinal wall and possibly also by the formation of a toxin.

Male patients in China are usually most seriously affected by ankylostomiasis. Anæmia is marked if not extreme, the conjunctiva often appearing almost bloodless. Accompanying the anæmia is a yellow, earthy condition of the skin, very closely resembling that of malarial cachexia, with which it is constantly confounded. As a result of the anæmia, in extreme cases, there is

swelling of the legs, breathlessness and general anasarca, with a tendency to hæmorrhage, especially from the nose.

A number of drugs have been used in treatment but perhaps the best is a mixture of 3 cc. of carbon tetrachloride with 1 cc. of oil of chenopodium given in a cup of milk, followed immediately by half an ounce of Epsom salts dissolved in plenty of water and repeated in a couple of hours if the bowels have not by this time freely moved. The question of diet is a matter of serious importance. There should be no preliminary starvation, but alcohol and fats should be cut out for at least a day before and a day after the treatment. The diet should be rich in carbohydrates and proteins.

The source of infection in hookworm disease in China is doubtless to some extent the fouling of the ground by indiscriminate defecation, but the use of liquid excrement for fertilizing the soil is even more important. Ordinarily, this is deposited in pits and left to mature and the maturing process kills off the bulk of the hookworm larvae. In vegetable and flower cultivation and on mulberry plantations, however, the use of fresh fæces is employed. From the buckets holding this, the legs of the carriers are constantly splashed with the contents. The hookworm infestation rises to over 90% in these workers and the incidence of hookworm disease is very large.

### *Schistosomiasis (Schistosomum japonicum)*

Among all the helminthic infections in China this is probably the most serious. It has a wide distribution, it is very disabling in its nature, and in the long run it has a high mortality. In a few places it has proved such a menace that whole areas have gone out of cultivation, and have been deserted by the inhabitants. It is a constant threat to foreigners in the endemic regions. Unfortunately the areas of schistosoma infection have not been fully investigated. There is probably no infection north of the provinces bounding the Yangtze. The infection is heavy but patchy throughout the whole length of the navigable portion of the Yangtze river. It is to be found in many regions of southern China, even up in the mountains of Yunnan where there is an important area of infection near the Tali lake.

The worm is met with in man, dog, cat and horse, and, to a less extent, in cattle. The adult worms are found in the mesenteric veins and hepatic portal system. The eggs are laid in the smaller veins whence they break through into the lumen of the gut, liver,

pancreas, etc. The eggs have a well marked operculum and a small terminal spine. They are about half as large again as the eggs of the roundworm. The eggs are passed with the fæces and, mixed with water, they hatch out a miracidium which infects a minute snail (*Oncomelania*) found in enormous numbers on the edges of lakes, ponds, narrow canals and ditches. After further development a free swimming cercaria escapes from the snail and attacks mammals, penetrating their skin.

The symptoms that develop after an incubation period of about ten days are as follows: a febrile period with considerable night temperatures; frequently a marked urticaria; an abdominal pain, sometimes with dysenteric symptoms, paroxysmal cough and a very high eosinophilia of 60% or over. The last stage, and this may be greatly prolonged, is marked by increasing enlargement of liver and spleen. The latter is often enormous reaching down well below the umbilicus. The terminal condition is one of emaciation, contracted liver, ascites, protuberant abdomen and swelling of the lower limbs. No satisfactory treatment is known. Tartar emetic and possibly emetine may be helpful. Splenectomy of the greatly enlarged spleen may be successful but operation risk is high.

Infection is acquired by bathing or wading in shallow lakes, ponds, ditches or slow moving canals and streams. The cercaria is not usually found in ricefields, larger canals or swift streams or rivers. Unfortunately, this statement needs qualification and the matter is of such importance that a detailed note should be given here.

The writer some years ago was asked to investigate a group of cases of infection in Shanghai. It was found that all the patients had been swimming in a large creek commonly used for bathing and regarded as quite safe from infection. It was found that the neighbouring ditches harboured *Oncomelania* snails, a proportion of which were infected but this did not account for midstream infection. The final explanation was that the bathing took place after a period of excessive rains with flooding of the fields, and that the farmers had pumped the water out of the fields into the ditches, the contents of which had been washed out into the main stream, infecting temporarily the bathing areas. The same year a request came to investigate an infection of British sailors who had been bathing in the Yangtze river at a place where the current was strong and the river over a mile wide. It was found that bathing had taken place near one bank where infection present in the ditches had been washed into the river itself by flood waters.

The rules of safety are therefore fairly clear. No one should bathe in lakes or even rivers except well away from the banks and not even then in times of flood. No shooting parties should wade in swamps, pools or ditches or on the edge of lakes unless the legs are well protected by high boots or waders.

### *Clonorchiasis*

This is a small trematode worm infecting fish of the cyprinoid type. The fluke is about 14 mm. long by 4 mm. broad. It is conveyed to man by the eating of raw fish. While the distribution of the infection in fish is widespread, the infection in man is confined to the areas where raw fish forms an article of diet. This especially is the Canton region of the province of Kwangtung, extending up the Si kiang as far as Wuchow in the province of Kwangsi. A second area of heavy endemic infection is found in the Chaochow prefecture of Kwangtung province.

Characteristic symptoms of the disease are enlargement of the liver, recurrent jaundice and diarrhœa, and finally, after a period of years, anasarca and cachexia.

The adult worm inhabits the smaller biliary channels. The egg, very small (0.027 by 0.015 mm.), with a small well-marked operculum, is passed in large numbers in the stool and easily confirms the diagnosis. The egg passes into water (and it may be noted here that latrines in the endemic area are often placed over fish-ponds) and develops a miracidium which attacks a small snail. From this a free swimming cercaria evolves which encysts on the fish and is conveyed to man by eating raw or half-cooked fish.

The current treatment is unsatisfactory, but gentian violet, in large doses, is possibly effective in early cases.

### *Fasciolopsiasis*

*Fasciolopsis buskii* is the largest of the trematode worms commonly affecting man. The fluke varies greatly in size, the length measuring from 12 to 100 mm., and the appearance varying from a long thin worm to one thick and ovoid in shape. It is commonly found in man, cattle and pigs, and is conveyed to the host by the eating of raw water calthrops and other tuberous water vegetables. The heaviest centre of infection is the region of Shaohing in the province of Chekiang, where, in some of the villages, there is an 100% infection. The disease is to be found also in most of the provinces of South China.

Characteristic symptoms of the disease are intermittent diarrhoea over a period of months or years, often associated with the passage of mucus. Pain may be slight or severe. In advanced cases œdema is marked and in fatal cases ascites and extensive anasarca are present. Children often show very protuberant abdomens.

The adult worms live in the alimentary canal, especially the duodenum. The eggs are large, measuring 0·138 by 0·083 mm., have a thin shell, a very small operculum and granular contents. They are nearly colourless. Developing in a very small snail, the cercaria finally encysts on the skin of water vegetables. The number of flukes infesting the host may be enormous; the case of a family of father, mother and two children is recorded from whom 7,622 flukes were recovered.

Of a number of effective drugs for treatment, carbon tetrachloride combined with oil of chenopodium as given for ankylostomiasis is probably the best (see p. 287).

#### *Paragonimiasis (Paragonimus westermanii)*

This is a disease known as endemic hæmoptysis caused by the presence in the lung of a small trematode parasite. The fluke is roughly the size and shape of a large pea. The ova are large, about 0·09 by 0·07 mm., of a yellowish colour, with a very well marked operculum and very distinct nucleus. They are found in large numbers in the sputum. The infection is common in cats, tigers, leopards and panthers throughout China, but in man it occurs only (so far as our knowledge at present goes) in Korea and Formosa and in a few isolated districts. It is conveyed to the host by the eating of raw or insufficiently cooked freshwater crabs and crayfish. The first intermediate host is a small snail; from this a free swimming cercaria escapes which encysts in crab and crayfish.

The characteristic symptom is a chronic cough, often very slight, and giving, as a rule, few if any physical signs. The cough is often accompanied by rusty sputum and sometimes by traces of fresh blood. Occasionally there is serious bleeding from the lung. There may be periods when the sputum is entirely free from blood, but the ova are always present in it. Aberrant worms are occasionally found in other situations, and in the brain and spinal cord give rise to serious and sometimes fatal symptoms. Apart from these, the presence of the worm in the lungs affects little the life of the host.

Treatment is not very effective, but emetine injections seem to be most hopeful. Prevention is easy by not eating raw crabs or crayfish.

## POISONS

*Poisons of animal origin* are not common in China. Venomous snakes are rare, and deaths from snakebite are very uncommon. The cobra has, however, been introduced into both China and Formosa, probably from Rangoon rice ships, and it seems to be increasing in numbers. Scorpions are common and the sting very painful but hardly ever fatal. Centipedes again are widespread and the bite is extremely painful.

Tetradon poisoning, a form of poisoning due to eating a tetradon fish, is common, and has been the cause of many fatalities. January and February are the only months in the year when the fish appears to be dangerous as food, and the poisoning is attributed to eating its liver and spleen.

*Poisons of vegetable origin* are more important in China. Varnish poisoning (lacquer poisoning) is among the most common. The sap of the *Rhus vernicifera* or varnish tree is used extensively in the lacquering of tables and ornaments, for which Foochow is especially famous. It also enters largely into the composition of Ningpo varnish, very widely used for varnishing wood and floors. Those engaged in the trade are always early affected but gradually acquire a complete immunity. The susceptibility of other individuals varies greatly, but usually, after exposure of the lacquer or varnish to the air for a week or two, the danger of poisoning disappears; a few react to the lacquer after several weeks' drying, and these specially susceptible people may get an attack of poisoning by walking to windward of a varnish tree.

The symptoms are those of an acute generalized dermatitis with heat, redness and great swelling of the skin, followed by extensive blistering. Treatment is by the application of lactic acid (2% in 95% alcohol) in the very early stages; and soothing lotions when the lesions have developed.

Atriplicism is common in famine regions of North China, caused by the eating of weeds and herbs, among them *Atriplex serrata*. Great œdema of the skin, especially of the face, with vesication and sloughing is caused by the poison.

Datura poisoning from biting the fruit of *Datura alba* and *Datura stramonium*, which are found all over China, is common in young children and is occasionally fatal.

Opium, crude raw opium and its derivatives morphine and heroin, is pre-eminently the common poison in China. In the form



of raw opium it is taken very largely in cases of suicide, which are very numerous. It is also used in the utterly degrading habit of opium smoking. Its physical effect is very marked where malnutrition is present, less so where plenty of food is available ; its moral effect is bad everywhere. Morphine by injection, and heroin either by injection or as a snuff, are absolutely ruinous, both physically and mentally ; and, where constant injection is used, almost always cause keloids and ulcers of the skin.

The question of the habitual use of opium and its derivatives in China is so mixed up with the Japanese invasion of the country that it is impossible to assess the position at the moment. Before the present struggle began, the Chinese were making great and successful efforts to rid the country of opium, though greatly hindered by the Japanese use of extra-territorial rights to import the drug, especially in the north. With the occupation of large parts of China by the invading forces, these drugs have flowed in again in an enormous stream. Whether this was done merely as a matter of trade or deliberately to debauch the people, it is impossible to say ; but after Hankow, for example, was occupied, opium dens appeared in every street, and morphine and heroin were dispensed by pedlars, who for a small sum would give the necessary injections. It is, however, a capital offence to sell these drugs to a Japanese !

### SOME HINTS ON THE PRESERVATION OF HEALTH

#### 1. *Water Supply*

A pure water supply is unfortunately a rare thing in China, though efforts to attain it were being made with some success before the present conflict. The health authorities were fully alive to the dangers, and where a modern system was, or was being, installed the bacterial content was checked and every effort made to supply reliable drinking water. But it has to be remembered that modern installations are still scarce, and the bulk of the drinking water is drawn from shallow and often polluted wells, or taken direct from rivers. In one case, water taken from the Yangtze river for use in a large city was found by examination of the carriers' buckets to contain living cholera vibrios. For visitors to China the water must therefore be considered suspect unless authoritatively stated to be drinkable.

In the country always, and in most of the cities too, drinking water must be boiled. A good Berkefeldt filter is a possible substitute for boiling but only if the candles are cleansed and boiled every

week and if this is not left to the servants to do. The prevalent idea that a large tot of whisky, or other spirit, purifies a glass of impure water is foolish and incorrect.

## 2. *Fruit and Vegetables*

Fruit is safe if thick skinned and not exposed in already cut sections, a common procedure with melons, in shops. Anything exposed to flies is dangerous. Such fruit as strawberries is particularly liable to ground infection, and is therefore especially dangerous.

Fresh vegetables should never be eaten unless it is absolutely certain that they have been grown on soil where only chemical fertilizers are used. The great bulk of such vegetables are grown on soil fertilized by night-soil and are very dangerous.

## 3. *Chinese Food*

This, speaking generally, is the best cooked in the world and very palatable. Dishes so cooked and served hot are absolutely beyond suspicion and the diet of the well-to-do Chinese is wholesome and varied. But one warning should be given. At the beginning of a Chinese meal it is common to serve cold *hors d'œuvre* and this often includes fresh uncooked vegetables. These should be definitely avoided. Chopsticks, which take the place of our cutlery, and bowls are scrupulously clean in private houses and good restaurants, but this is not by any means so certain in country inns. It is not a bad plan to carry one's own chopsticks when travelling or else to insist on boiling water being poured over bowls and chopsticks before the meal is taken. Cold water should not under any circumstances be drunk at inns or when travelling, but hot Chinese tea is always available and nothing is more refreshing or safer than a drink of hot rice water, the water in which rice is boiled, and which can be had at any wayside eating house in South China.

## 4. *Sunstroke*

A word should be said here as to the care of the head in tropical and subtropical China. While fatal sunstroke is very rare, much invalidism has been due to want of reasonable care. The question is what is 'reasonable care'. And here is the curious paradox that while few foreigners in South China are seen without hats, few in Manila, much farther south, wear any protection to the head, and yet sunstroke there is practically unknown. It should be noted

that insolation is probably due as much to intense glare on the eyes as to the direct rays of the sun on the head. The writer would far sooner have dark glasses for his eyes than a sunhat if choice had to be made between the two. There is no doubt that, so far as China is concerned, much unnecessary emphasis has, in the past, been placed on sunhats and the like. It has, however, to be remembered that no two people react in the same way to the tropical sun, and while to some no head covering is needed, to others efficient protection is essential. The wise thing is to be unnecessarily careful perhaps while one is a newcomer, and to learn by experience what is necessary for oneself. It cannot be too strongly emphasized that even a minor attack of sunstroke may sensitize the patient to sunrays which, thereafter, with little exposure may give rise to devastating headaches.

#### 5. *Smallpox*

This infection is everywhere in China and practically every unvaccinated foreigner acquires the disease, which is often fatal and always disfiguring. Hence conscientious objectors to vaccination are practically unknown in China. Vaccination should be performed before arriving in the country and repeated at two-yearly intervals, preferably with locally prepared vaccine which seems to be more effective for the local disease.

#### 6. *Typhoid and Paratyphoid Fevers*

These are very common among foreigners and triple typhoid vaccination should be given before arrival and repeated at least every three years.

#### 7. *Cholera*

It is not unusual to insist on cholera vaccination before arrival in China. This is hardly necessary but such protection should be given at times and in places where cholera is prevalent. A mixed vaccine of typhoid, paratyphoid and cholera is often given, but is generally inadvisable. Simple cholera vaccine gives practically no reaction and that to the modern typhoid vaccines is very slight, but the mixed vaccine may give quite severe reactions in a good many people. Separate vaccination is therefore preferable.

Typhoid, cholera and dysentery are usually water-borne diseases or carried on infected vegetables and the precautions already mentioned in this connection should be scrupulously followed.

### 8. *Plague and Paratyphus*

These are flea-borne diseases from the bite of rat fleas. A continual war should be carried on against rats in houses, by frequently clearing out all rooms where rubbish accumulates and by filling up of all rat holes with cement. A cat in the house, even though not a ratter, keeps rats away. In the improbable event of having to handle a person with pneumonic plague no approach to the patient should be made except when wearing a gauze mask which efficiently covers mouth and nose.

### 9. *Typhus and Relapsing Fever*

These are louse-borne diseases and protection against them is very difficult. The bite of a single infected louse may give rise to the disease. Vaccines against typhus are very difficult to prepare, have little keeping power and are seldom available. They are being rapidly improved and made more available and should certainly be used, if possible, in any area where an epidemic is present. Their protective power lasts only a few weeks.

Sleeping on a native bed in a Chinese country inn should never be allowed; these beds, with their straw mattresses, abound in voracious vermin. A camp bed should always be carried and placed well away from the walls, and the mosquito net should be hung on supports from the bed. A liberal application of insect powder at the point where the feet of the camp bed touch the floor is a further insurance against vermin.

### 10. *Malaria and Filariasis*

Both these diseases are mosquito borne and the precautions for the avoidance of infection have already been fully dealt with (see p. 278).

### 11. *Leprosy and Tuberculosis*

The dangers of infection with leprosy are so slight as to be quite negligible. The writer at one time employed a leper gardener and the only precaution taken was to forbid his playing with the children. Tuberculosis has a higher risk but not much more than in England. If the infection is more widespread the open built houses of foreigners counterbalance it. But it must be insisted that subjects already tuberculous should not come to China; the climate is certainly unsuited to them.

## 12. *Helminthic Infections*

Ascariasis (roundworm infection) is to a minor degree unavoidable and need not be taken seriously in adults. An eye should be kept on the infection in children. Ankylostomiasis (hookworm disease) is seldom seen in foreigners and infection is easily avoided. Schistosomiasis is the only infection with a serious threat to foreigners. Reference should be made to the detailed information about it on p. 289. The two great dangers to foreigners are swimming in infected waters and wading when shooting game. Bathing should be permitted only after reference to local medical authorities as regards the safety of the waters. As to wading, this should be done only when wearing long protective boots or waders.

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PART TWO  
HISTORY AND PEOPLES

Chapter XI

OUTLINES OF CHINESE HISTORY TO THE END  
OF THE EIGHTEENTH CENTURY

*Origins of Chinese Civilization, circa 3000-1200 B.C.*

*The Early (Western) Chou Dynasty and the Expansion of Feudal China, circa 1200-770 B.C.*

*The Later (Eastern) Chou Dynasty: The Feudal System in Decline: The Growth of Regional Kingdoms and the Era of 'The Warring States' (Chan Kuo). 770-221 B.C.*

*The Unification of China and the Imperial Age, circa 222 B.C.-A.D. 214.*

*Between the Han and the T'ang Dynasties: 'The Age of Confusion'; Nomad Penetration and Internal Disruption. Third to sixth century A.D.*

*The T'ang Dynasty and the Zenith of the Historic Civilization, 618-960.*

*The Sung Dynasty, 960-1279: Tartar North and Chinese South.*

*The Mongol Conquest and the Yuan Dynasty, 1279-1368.*

*Chinese Recovery: The Ming Dynasty, 1368-1644.*

*China on the Eve of Conflict with the West: The Ch'ing (Manchu) Dynasty and Empire to circa 1800.*

*Bibliographical Note.*

For an all too brief period, which was ended by the Japanese attack on Manchuria in 1931, the new National Museum of China was installed in some of the former palaces of the Forbidden City in Peking. Within this superb setting could be enjoyed a magnificent and representative collection of Chinese works of art ranging from Shang bronzes of the second millennium B.C. to modern times. Those who were privileged to see it received a vivid impression not only of the antiquity and richness of Chinese civilization but of its essential continuity. No other country of the modern world has inherited a cultural tradition so long, distinctive and unbroken. Some understanding of it is essential to the appreciation of the New China now emerging, which, however modernized and filled with new aspirations, is deeply conscious of and profoundly influenced by its inheritance. To most educated Chinese, even the more technically minded, the different phases and dynastic divisions of

their country's history are familiar and mean a great deal, much more so indeed than such terms as Plantagenet, Tudor, Stuart and Hanoverian mean to most educated Englishmen. The object of the present chapter is to describe, subject to severe limitations of space, the chief phases of China's evolution in its political, cultural and economic aspects down to the critical modern period (discussed in Volume II) when the traditional culture came into conflict with that of Western Europe. A supplementary chapter then attempts to appraise the characteristics and significance of the historic civilization as a whole.

# I. THE ORIGINS OF CHINESE CIVILIZATION, *circa 3000-1200 B.C.*

Of the early human occupation of North China there is definite evidence in the discovery of the remains of *Sinanthropus* ('Peking Man') in the cave of Chou K'ou Tien, not far from the former capital, and of fairly numerous palæolithic implements of Mousterian and Aurignacian type in the Hwang ho valley and the Ordos region. All these sites are at the *base* of the loess deposits, and then occurs what seems to be a very significant break in the continuity of the human record in this part of Eastern Asia, for no remains of the mesolithic and early neolithic cultures have as yet been discovered. The inference is that the climatic conditions during the long period of loess deposition were too unfavourable for human life.

The real story of China begins in the later neolithic period, of which there are abundant remains in the north—in Kansu, Honan and Shantung—and also in Fengtien (south Manchuria) and in Mongolia. The majority of these neolithic sites disclose a primitive mode of agricultural life essentially similar in character to that of neolithic communities in other parts of the world. Mongolia—then almost certainly less arid than now—may well have been the immediate source of its introduction into North China, for in Mongolia—beyond the scene of loess deposition—there is evidence of development from a hunting-food-gathering economy to one which practised the rudiments of sowing and reaping.

The important developments which raised agricultural practice from this primitive neolithic stage to a much higher level are associated with the belt of loess or yellow earth (*hwangtu*) extending from Kansu in the north-west through the Wei ho—Yellow river trough on to the central portion of the North China Plain and so to

## TIME CHART

Traditional Date of the Accession of Hwang Ti (the Yellow Emperor), the Legendary Founder- Hero of China .. .. .	2697 B.C.
Traditional Dates of the <i>Hsia Dynasty</i> (beginning with the Emperor Yü) .. .. .	2205-1766 B.C.
Traditional Dates of the <i>Shang (Yin) Dynasty</i> ..	1766-1122 B.C.
(The Anyang Civilization, which is now identified with the <i>Shang (Yin) Dynasty</i> ) ..	<i>Circa</i> 1400-1200 B.C.
<i>The Chou Dynasty</i> .. .. .	Twelfth century-256 B.C.
(a) The Western Chou (the Age of Feudalism)	Twelfth century-770 B.C.
(b) The Eastern Chou .. .. .	770-256 B.C..
(1) The Period of 'The Spring and Autumn Annals' ( <i>Ch'un Ch'iu</i> ) ..	<i>Circa</i> 722-481 B.C.
(2) The Period of 'The Warring States' ( <i>Chan Kuo</i> ) .. .. .	<i>Circa</i> 481-221 B.C.
(Confucius: 551-479 B.C. Mo Ti: <i>circa</i> 500-420 B.C. Mencius: <i>circa</i> 372-289 B.C. Chuang Tzü: <i>circa</i> 369-286 B.C. Han Fei, <i>d.</i> 233 B.C.)	
<i>The Ch'in Dynasty</i> .. .. .	255-206 B.C.
Shih Hwang Ti ('The First Emperor') ..	222-209 B.C.
<i>The Han Dynasty</i> .. .. .	206 B.C.-A.D. 214.
(a) Former or Western Han .. .. .	206 B.C.-A.D. 25.
Emperor Wu Ti .. .. .	140-86 B.C.
(b) Latter or Eastern Han .. .. .	A.D. 25-214.
'The Age of Confusion' .. .. .	A.D. third to sixth century.
(Epochs of 'The Three Kingdoms' and of 'The Six Dynasties') .. .. .	A.D. 221-265.
<i>The Sui Dynasty</i> (China Re-united) .. .. .	A.D. 589-618.
<i>The T'ang Dynasty</i> .. .. .	A.D. 618-907
Emperor T'ai Tsung .. .. .	627-650.
'The Five Dynasties' .. .. .	A.D. 907-960.
<i>The Sung Dynasty</i> .. .. .	A.D. 960-1279.
(Known as 'The Southern Sung' from 1127, North China being thereafter under domina- tion of the Kin Tartars.)	
Chu Hsi .. .. .	1130-1200.
<i>The Yuan (Mongol) Dynasty</i> .. .. .	A.D. 1279-1368.
Emperor Shih Tsu (Kublai Khan) .. .. .	1279-1294.
Marco Polo in China .. .. .	1275-1290.
<i>The Ming Dynasty</i> .. .. .	A.D. 1368-1644.
Emperor Hung Wu .. .. .	1368-1398.
Emperor Yung Lo .. .. .	1403-1424.
<i>The Ch'ing (Manchu) Dynasty</i> .. .. .	A.D. 1644-1912.
Emperor K'ang Hsi .. .. .	1662-1722.
Emperor Yung Cheng .. .. .	1723-1735.
Emperor Ch'ien Lung .. .. .	1736-1796.



the borders of the Shantung Uplands (Fig. 23). The existence of this great west-east zone—from Turkestan to the East China sea—of exceptionally fertile soil, free from both forest and marsh and pre-eminently adapted to primitive agriculture, is the most vital geographical factor in the initiation of Chinese civilization. The terrain was not only intrinsically favourable; it lay open to external cultural influences drifting through the fertile oases of Turkestan in the Central Asian corridor from the most ancient centres of human civilization in Mesopotamia and Western Asia. The chief problems connected with Chinese cultural origins concern the provenance of the ingredients of the great Bronze Age civilization centred in Anyang in the middle of the second millennium B.C.,

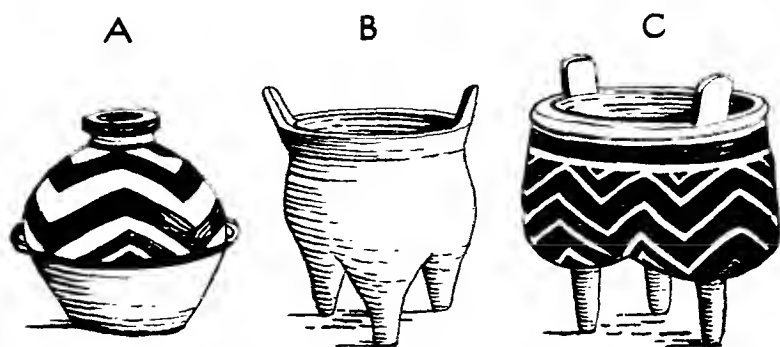


Fig. 104. Early pottery

Based on Roxby, P. M., 'The Terrain of Early Chinese Civilization', *Geography*, vol. xxiii, p. 233 (London, 1938).

A, painted pottery (Kansu). B, a *Li* tripod. C, Shang bronze vessel with decoration showing the influence of painted pottery designs.

which is described in a succeeding paragraph. How far were they derived from indigenous developments of the late neolithic culture of North China itself, how far were they the result of indirect cultural contact with the old civilizations of Western Asia? The early importance of the latter connection was demonstrated some years ago by the discovery of the famous *painted pottery* or *Yang Shao* ware (Fig. 104, A and C) at several sites in or near the Kansu corridor, in Honan (where the type station of Yang Shao is situated) and even in south Manchuria. It is generally agreed that the painted pottery originated in the early culture of Western Asia whence, accompanied no doubt by associated arts, it spread outwards both to north-west India and to China by way of the Central Asian oases, Anau on the Persian border yielding notable examples.

The more detailed study of the Yang Shao culture in China has clearly shown that it appeared earlier and lasted much longer in the western (Kansu-Shensi) than in the eastern (Honan-Shantung) half of the Chinese loess zone. So great was the significance attached to the evidence of the painted pottery that T. J. Arne of the Chinese Geological Survey could write in 1925 that 'The finds . . . have removed China from its isolation from the cultural development of the West.'\* But more recent discoveries of no less significance have emphasized the importance of *indigenous* developments in the final Anyang culture complex. At many sites in the loess of North China, but particularly in the eastern plain, has been disclosed the existence of an advanced neolithic culture far more developed than the primitive forms hitherto known, and apparently wholly native in origin. It is known as the *black pottery culture* from the very distinctive form of black, usually glossy, wheel-made pottery which particularly distinguishes it. One of the most frequent and striking forms of this black pottery is the characteristically Chinese bulbous *Li* tripod whose technique was afterwards embodied in the Shang culture of Anyang. The type station of this black pottery culture is Ch'êng Tsù Yai, just to the north of the sacred Tai shan in Shantung and about ten miles east of Tsinan (Fig. 104, B). Excavations show this to have been a rectangular town of considerable size, surrounded by a wall of 'pounded' earth of a type which again appears in the Anyang culture and became a distinctively Chinese form of wall-building. The finds included extensive remains of the horse, sheep, and ox—absent from the earlier neolithic sites—and also divination bones, which again are characteristic of the Anyang culture. The facts so far known point strongly to the origin of the black pottery culture in the eastern plain and of its gradual spread to the west (Kansu-Shensi) where it superseded that of the Yang Shao.

### *The Anyang (Shang or Yin) Civilization*

Few archæological excavations of recent times have proved of greater historical importance than those initiated in the Anyang region by the then newly formed *Academia Sinica* in 1928 and continued for some years until increasing Sino-Japanese friction brought them to a standstill. Their chief significance lies in the flood of light which they throw on the credibility of the 'orthodox'

\* Arne, T. J., 'Painted Stone Age Pottery from the Province of Honan, China *Palæontologica Sinica*, series D, vol. i, fascicle 2, p. 34 (Peiping, 1925).

account of early Chinese history, based on literary and traditional accounts. The legendary period of heroes and semi-divine Emperors must here be omitted, although it may be noted that Ssü-ma Ch'ien, the great Han historian of the first century B.C., considered authentic Chinese history to begin with Hwang Ti, the Yellow Emperor, whose traditional date of accession is 2697 B.C. He still figures in popular thought as the founder-hero of Chinese civilization. The real question, however, concerns the dynastic

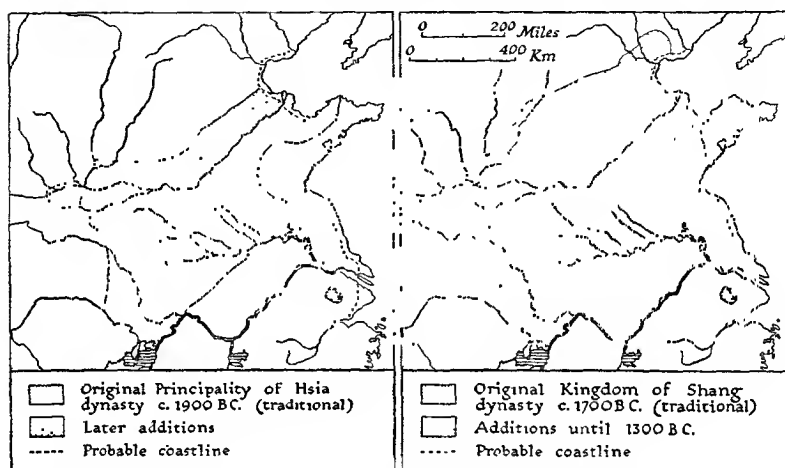


Fig. 105. The territories of the Hsia and Shang dynasties

Based on Hermann, A., *Historical and Commercial Atlas of China*, p. 9 (Cambridge, Mass., 1935).

The two maps show the gradual extension of settlement and control over the North China Plain southwards to the Yangtze kiang. The probable coastline has been included, but the rivers are those of 1935. These and all other maps in this chapter, dealing solely with China, are on a uniform scale, so that it is possible to trace the gradual development of the Middle Kingdom.

period, with which Chinese history, as ordinarily understood, may be said to begin. According to the received or orthodox Chinese view the first or *Hsia* dynasty was founded by the famous Emperor Yü, a great water engineer whose success in coping with the Yellow river floods led to his being invested with the imperial office. To him is attributed, in 'The Tribute of Yü', an early historical document, a tremendous record of drainage achievements and a geographical survey and administrative demarcation of an empire already covering North China and much of the Yangtze valley. The *Hsia* dynasty lasted, according to the traditional dates, from

2205 to 1766 B.C. and was succeeded by that of the *Shang* (or *Yin*) which claimed descent from the Yellow Emperor. This dynasty, very celebrated in Chinese annals, endured for 600 years (1766–1122 B.C.) and was eventually superseded by that of the *Chou* coming from the west.

Until the full significance of the Anyang excavations was disclosed, this traditional view of early Chinese history was regarded by western scholarship with considerable scepticism and both the Hsia and Shang dynasties were treated as legendary or semi-legendary. Chinese history and chronology were accepted as authentic only from the middle of the ninth century B.C., and there was a strong tendency to regard the Chous as the probable importers of a higher culture, in large part derived from the west. The Anyang discoveries have greatly changed this perspective and these must now be summarized.

The position of Anyang is a defensible site, partly enclosed by a tributary of the Hwang ho, on the higher western edge of the North China Plain; it is approximately midway between the western and eastern portions of the Chinese loess zone already described; at the same time it is so placed as to be well within the direct range of cultural influences coming by the Kansu corridor route from the west. Attention was first attracted to the site by the discovery of great numbers of inscribed bones and tortoise shells, which proved to be for divination purposes ('oracle bones'). These inscriptions are written in Chinese characters, archaic, but far removed from primitive picture writing and pointing to a long period of evolution. The internal evidence proved beyond doubt that they were 'the archives' of the Royal House of Shang preserved in what was then the dynastic capital. The records closely corroborated the traditional accounts of the dynasty and could be assigned to the latter half of the second millennium B.C. The subsequent scientific excavation of the site disclosed an advanced Bronze Age culture, based on the cultivation of wheat and millet and on animal husbandry. It was characterized by city life within walls of pounded earth, organized state services, the use of horse-drawn chariots, bronze sacrificial vessels of advanced technique and beautiful design, sculptures of great merit, and the elaborate use of cowrie shells for money. It was obviously a culture of composite origins. Many of its most distinctive features were clearly derived from the earlier black pottery culture. On the other hand, the use of wheat—not found in the Chinese neolithic sites—and the initial technique of

casting in bronze are believed to have been due to indirect cultural contact with Western Asia.

To summarize, the evidence of Anyang has established the historical reality of the Shang dynasty and, in conjunction with that of the black pottery sites, shows North China to have been one of the original foci of early civilization, influenced and enriched at different stages by culture drifts from Western Asia and Europe, but evolving on its own lines and with very distinctive features. Capacity for

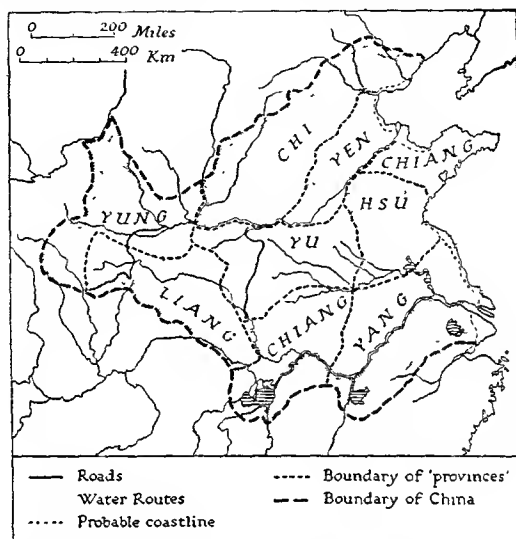


Fig. 106. China at the end of the Shang dynasty, c. 1100 B.C.

Based on Hermann, A., *Historical and Commercial Atlas of China*, pp. 10-11 (Cambridge, Mass., 1935).

China was divided into nine 'chou' or 'provinces'. Water routes were already of great significance, and the territory held then extended just south of the Yangtze and northwards towards the present frontier.

assimilation to its own genius has been one of the dominant characteristics of Chinese civilization from its earliest beginnings. Archaeology has not yet confirmed the existence of the Hsia dynasty, but future excavations may well show it to be equated with the phase of development indicated by the black pottery culture. The regions of origin and the subsequent expansion of the Hsia and Shang (Yin) dynasties, according to the traditional Chinese accounts, are shown in Fig. 105. The traditional divisions or 'provinces' of China in the latter dynasty are shown in Fig. 106; these correspond to those enumerated in 'The Tribute of Yü'.

The nuclear region, in the case of both dynasties, is the Hwang ho valley below Tungkwan and the rich belt of calcareous loess where the river emerges into the North China Plain.

## II. THE EARLY (WESTERN) CHOU DYNASTY AND THE EXPANSION OF FEUDAL CHINA, *circa* 1200-770 B.C.

If the curtain rises on an already advanced Chinese civilization in the time of the Shang dynasty in the later half of the second millennium, the Chou dynasty, which spans approximately three-quarters of the first millennium before the Christian era, witnesses its rapid development and expansion. The conquering group of the Chous came from the west, but probably not farther west than the region of the Wei ho valley and the head of the Kansu corridor. This has been again and again a crucible region of vast significance to China. It lies within the belt of fertile loess and of normally sufficient rainfall and so was in touch with the characteristic developments of Chinese agriculture farther to the east. But it is closely bordered by the steppe, and upon it impinged not only the influences coming by way of the Turkestan oases from Western Asia, but also those of the virile, pastoral nomads of the grasslands. Here there tended to be formed under able rulers a strong, composite society which has given many masters to China. The Chou conquest is the first great example of it, and it was as guardians of the marches, 'Chiefs of the West', that the Dukes of Chou acquired the power to overthrow the Shang dynasty which had become effete and discredited. The initial level of culture of the Chous was almost certainly lower than that of the regime which they replaced, but they assimilated and invigorated its civilization and there ensued a long period of steady expansion.

This was *par excellence* the feudal age of China. The basis of the civilization was an agricultural technique raised above the level of the mixed economy of the surrounding tribes by the practice of irrigation. This permitted the growth of heavier and more certain crops, and led to greater accumulation and concentration of wealth in the hands of the feudal chiefs. The China of this period was a multitude of small agricultural principalities, each with its walled town containing the central granary. Land was the basis of wealth and government, and the colonizing movement, which now began on a large scale, was organized by the scions of the feudal houses. The outward expansion from the original nucleus in the northern

plain and its early offshoots in the fertile valleys of the Loess Plateaux, notably that of the Fên in Shansi, took place wherever the conditions permitted irrigation and suited the agricultural technique. From the calcareous alluvium of the Hwang ho plain it spread into the enclosed basin of the upper Han and so westwards into the Red Basin of Szechwan and southwards into the central basin of Hupeh and the valley of the lower Yangtze. Here was a very different terrain, where rice replaced wheat and millets as the dominant food-crop, where the water buffalo took the place of oxen, mules and donkeys and where different methods and appliances of irrigation were used. Much of the technique of rice cultivation may have been derived from India and other southern sources, but it is certain that from at any rate the beginning of the last millennium B.C. the Yangtze valley began to be drawn into the complex of Chinese colonization and culture radiating from the north. Throughout the Chou dynasty, however, it was on the fringe of that culture, and the states which developed amid its marshes and jungles were considered as semi-barbarian.

Even in the north there were wide gaps within the colonized area where unassimilated tribes of aborigines long survived in the swamps of the saline alluvium (see p. 56), the lake-studded valley of the lower Hwai and the rugged highlands of Shantung. To them, under such terms as 'island foreigners' and 'mountain barbarians', frequent references are made in the fascinating document known as 'The Tribute of Yü'.\* There is here attributed to the semi-legendary founder of the Hsia dynasty a prodigious work of river-drainage, land reclamation and forest clearance which must clearly have been spread over many generations. There is good reason to think that this unique geographical survey gives a picture of the position which had been reached in the early Chou dynasty, about 1000 B.C. It is the picture of an expanding agricultural society where great attention was paid to the quality of the soil as the basis of revenue and to what has always been the supreme technical problem of that society, water-control. The survey includes the Red Basin and the lower Yangtze valley, but the references to the latter show that it was still a jungle land in the early stages of reclamation. To the north-west the imperial domain extended to 'the shifting sands', i.e. the borders of the Gobi desert. In that direction nature set rigid

\* 'The Tribute of Yü' is a part of the *Shu Ching* or Book of History. The date of its composition is disputed. (See p. 387.)

limits to the outward expansion of Chinese colonization, for the increasingly arid conditions vetoed the use of irrigation and the agricultural technique based upon it. Here accordingly was already developing that nomad frontier which was destined to play so fateful a part in shaping China's subsequent development.

In this great formative period of the Chinese people it was the spread of a particular type of civilization—with an advanced mode of land utilization as its distinguishing economic characteristic, and the rapid evolution of a highly ingenious language and system of hieroglyphic writing as its dominant cultural traits—which acted as the real cement. The Chinese were never a distinctive 'race' marked off from their neighbours. As the aboriginal tribes assimilated this culture and came to speak its language they became 'Chinese' equally with the supposed descendants of 'The Yellow Emperor'.

At the head of the loosely organized confederation of multiple agricultural communities, held together by a common culture and outlook, was the Chou emperor, 'The Son of Heaven', one of whose chief duties was the ceremonial opening of the agricultural year by ploughing a furrow within the precincts of the Temple of Heaven. This close association of the imperial office with safeguarding the interests of a community dependent on agriculture, foreshadowed in the ancient story of Yü's election to it, was maintained down to the fall of the Ch'ing (Manchu) dynasty in 1912.

### III. THE LATER (EASTERN) CHOU DYNASTY. THE FEUDAL SYSTEM IN DECLINE. THE GROWTH OF REGIONAL KINGDOMS AND THE ERA OF 'THE WARRING STATES' (*Chan Kuo*). 770-221 B.C.

The middle and later portions of the Chou dynasty cover a long and deeply interesting phase in the social and political history of China. It may be said to begin with the sack of the imperial capital at Ch'angan in the Wei ho valley (Shensi) by the barbarian Jung tribes from the steppeland about 770 B.C. and its removal far to the east to Loyang on the Lo tributary of the Hwang ho, which it joins near the exit of the master river from the plateau to the plain. This enforced retreat was symptomatic of the growing weakness of the imperial authority, and the *Eastern Chou*, as the dynasty is called subsequent to its removal to Loyang,



exercised little influence on the dramatic course of events which culminated in the establishment of a centralized empire of an entirely different character.

In Chinese usage the history of the Eastern Chou falls into two periods :—

*Circa 722–481 B.C.* The *Ch'un Ch'iu* or period of 'The Spring and Autumn Annals'. (So-called from an historical chronicle kept in Confucius' state of Lu and traditionally ascribed to him.)

*Circa 481–221 B.C.* The *Chan Kuo* or period of 'The Warring States'.

In fact, however, the events and tendencies of these two periods form a continuous sequence and will be so treated in this brief survey.

The wide dispersal of feudal estates and principalities already described led inevitably to the growth of regionalism and separatism. In theory the emperor, 'the Son of Heaven', was the sole source of authority and the supreme lord of the land. But the organization was always very loose and, as the Chous lost their vigour and the heads of the more powerful or more distant states began to embark on ambitious policies of their own, the imperial authority became more and more nominal. The analogy in both theory and practice with the position of the Holy Roman emperor in medieval Europe is in many ways extremely close, and the political geography of China in the period of the Ch'un Ch'iu showed the same medley and intricate mosaic of principalities as that of medieval Germany.

At this stage there were about sixteen major 'states' and numerous minor fiefs. Of the former the majority lay in the heart of the northern plain and the bordering Loess Plateaux, i.e. in the original nuclear area of Chinese culture. The states of the *Chung-yuen* (the Middle Plain) considered themselves the true exponents of Chinese civilization and tradition, but they were small and crowded together and had no opportunity of expansion. At least four, including Wei—the imperial domain—were included within the area of the modern province of Honan, still often called *Chung-hwa* (Flower of the Middle). On the eastern border of the plain, based on the fertile terraces of alluvial loess around the borders of the Shantung highlands, were the two small but famous states of Ch'i and Lu, the latter especially renowned as the home of Confucius and other sages.

In contrast to the congestion of states in the cultural heartland, the newer principalities, which were developing on its periphery, had abundant room for expansion. The contrast in 'lebensraum' and potential power was like that between Kent, on the one hand, and Mercia or Wessex, on the other, in the England of the early Anglo-Saxon period. These peripheral states included (1) *Shu* in the Red Basin of Szechwan; (2) *Ch'u* (meaning significantly 'jungleland') in the Central Basin of the Yangtze and the valley of the lower Han, the vital link between the Yangtze and the north-west; (3) *Wu* in the lower valley and delta of the Yangtze; and (4) *Yüeh* on the south-east coast (Chekiang and Fukien). The last two were essentially maritime states with developing sea-power; (5) *Yen* in the northern marchlands of the *Chung-yuen*, on the borders of what is now Manchuria and in contact with the northern nomads, and (6) *Ch'in* in the north-west (Shensi), in the strategic region of the western marches, from which the Chous had originally come (Fig. 107).

All these peripheral states, and particularly those of the Yangtze basin and Ch'in, were regarded by the Chinese of the *Chung-yuen* as semi-barbarous, but their rulers in most cases came from that nuclear region, organized their states on the approved model and aspired to a dominant position. All through the Ch'un Ch'iu period disputes and wars between these rival states were growing in frequency, but as yet they were usually restrained by the code of ethics and chivalry that had been built up in the course of centuries to regulate the affairs of a feudal society which, whatever its internal differences, had definitely acquired a common cultural consciousness. It had the degree of unity, largely but not wholly theoretical, which the concept of Christendom gave to medieval Europe. The structure of society was in many ways similar. There was a feudal hierarchy in five grades whose European equivalents have been rendered as duke, marquis, count, viscount and baron, the term duke being at first confined to the rulers of the major states who claimed descent from or connection with the royal house of Chou. There was a privileged aristocracy which held all the important posts and commanded the armies of the different states. The mass of the people had no political rights, were compelled to serve in the feudal levies and had an economic status of virtual serfdom.

There was, however, a definite code of ethics governing both the relations of classes and the relations of states. Innumerable are the stories recorded, particularly in the historical work known as

the *Tso Chuan*, which have come down from the feudal age, stories which turn on nice points of social ethics and behaviour, such as whether treaties made under duress had binding sanctity or whether it was justifiable to attack an enemy when he was defiling through a

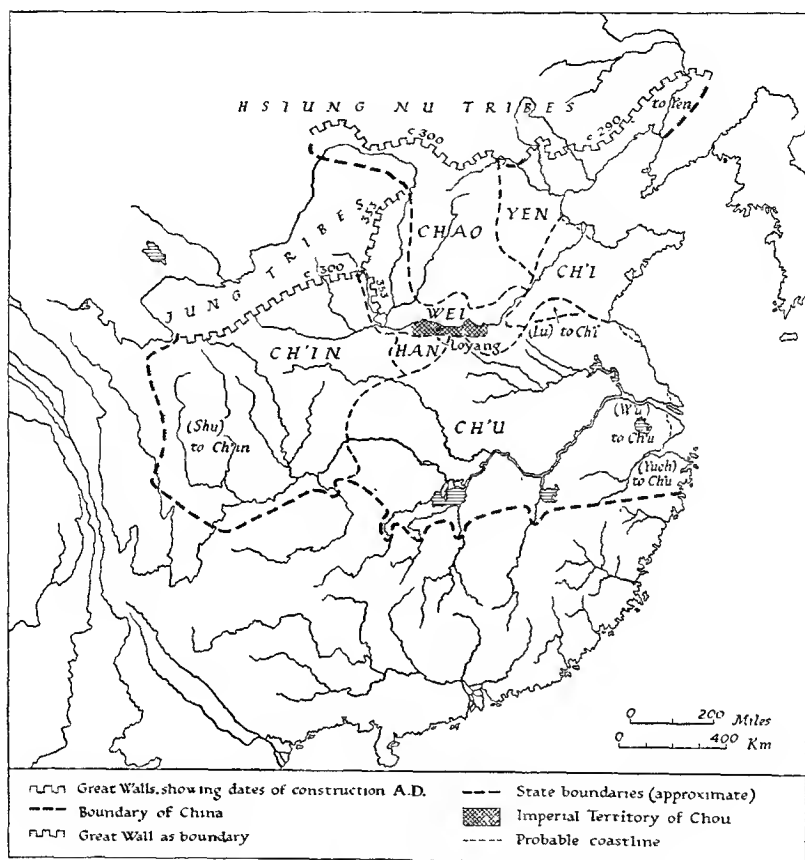


Fig. 107. China in the 'Warring States' period, c. 350 B.C.

Based on (i) Hermann, A., *Historical and Commercial Atlas of China*, p. 16 (Cambridge, Mass., 1935); and (ii) Fitzgerald, C. P., *China*, p. 66 (London, 1935).

The Imperial Territory of Chou was the last relic of the Chou dynasty. Great Walls were built at various dates as a guard against the warlike peoples of Mongolia.

difficult mountain pass. Many of these stories still live in the rich folk-memory of the Chinese people and appeal is often made to them by Madame Chiang K'ai-shek and others in relation to modern issues.

The evolution of an intricate ethical code, so early characteristic of China, had largely come about through the strong influence of scholar officials, which the precocious development of writing had made possible. These scholar officials were employed in all the states to advise on matters of policy and ceremonial and to draft decrees. It is noteworthy that many of the early Chou documents begin with the phrase 'The King agrees in saying', carrying the implication that it had been devised and drafted by members of the secretariat. It is also important to notice that these scholar officials were drawn from the same class as the administrators and officers who received a similar kind of training. The education of the *chün tzü* or 'sons of the lords' (i.e. the aristocracy) included history, music, poetry and detailed instruction in rites and ceremonies. In this respect they differed widely from the mainly unlettered medieval knights of Europe, who in so many ways are their counterparts. The historical structure of Chinese society differs profoundly from that of most other traditional agricultural civilizations in that there was no governing military class, and that the community of scholars, from whom the governing class was drawn, was never identified with a distinct priesthood. This generalization is of supreme importance in the appreciation of some of the most distinctive features of Chinese civilization.

The restraints, however, which this code of feudal chivalry imposed upon the conflicts between the states, became progressively weaker as the struggle for power deepened in intensity. In particular the newer peripheral states, where the older traditions were less deeply rooted and which, in warfare with the barbarian tribes, had acquired more ruthless methods, began to pursue a policy of undisguised aggression. It was clear that the old political order of society was breaking up. The period of the *Chan Kuo*, as this final phase of feudal China is known, was distinguished not only by the intensity of the inter-state conflicts but by great intellectual activity and rival schools of social and political philosophy of which the Confucian was one. Many of the problems which agitated thoughtful minds and which were the subjects of keen controversy were essentially the same in substance as those which vex modern Europe. Of these different schools of thought and rival theories of government some account is given in the succeeding chapter.

The vicissitudes of the actual struggle between the contending states make a very intricate story, but the general trend can be

quickly summarized. Inevitably the smaller and weaker states were gradually absorbed by their more powerful neighbours. The two master states which gradually emerged were Ch'u and Ch'in. The former, from its original base in the Central Basin and the Han valley, became the super state of the Yangtze basin below the Gorges, absorbing, after many fluctuations of fortune, the maritime territories of Wu and Yüeh and extending northwards to the Hwai and the borders of the Shantung Uplands. The latter was based, as already noticed, on the critical marcher region of the Wei ho valley in Shensi and, in constant struggles with the nomad tribes, some of which it incorporated, had built up a powerful army, especially distinguished by its cavalry, largely recruited from the steppeland. Early in the fourth century it greatly strengthened its already formidable geographical advantages by securing the passes through the Tsinling and Tapa shan and annexing Shu in the Red Basin of Szechwan, thus outflanking Ch'u on the west.

These two powerful states almost completely encircled the older and purely Chinese principalities of the *Chung-yuen*. Among them no comparable master state emerged, although Ch'i, which had absorbed Lu, the home country of Confucius, exercised a kind of hegemony for a considerable period. Attempts to form a united front against Ch'in by means of a confederacy or league met with temporary success, but in the end they were frustrated by the old rivalries, and eventually these older states were absorbed 'one by one'. In the third century B.C. the issue was narrowed down to a terrific conflict between Ch'in and Ch'u. The elimination of the latter by the military prowess of the western state was followed by the extinction of what remained of Ch'i and of the nominal sovereignty of the Chou dynasty.

Thus was achieved the territorial unification of China under the Duke of Ch'in, who now assumed the title of *Shih Hwang Ti*. This signifies 'First Emperor' and was deliberately intended to symbolize the inauguration of an entirely new imperial regime of an uncompromisingly totalitarian character. The title, as will be seen, was justified. The success of Ch'in in the protracted struggle for supremacy had not been due solely to her geographical advantages, great though these were, but to the adoption by her rulers of new methods and conceptions of government and statehood, quite foreign to Chinese traditions, but which were now to be ruthlessly imposed upon the forcibly united country (Fig. 108).

## IV. THE UNIFICATION OF CHINA AND THE IMPERIAL AGE,

*circa 222 B.C.—A.D. 214**The Ch'in Dynasty : 255 B.C.—206 B.C.**(Shih Hwang Ti : 222—209 B.C.)**The Han Dynasty : 206 B.C.—A.D. 214.**(Former or Western Han : 206 B.C.—A.D. 25.)**(Latter or Eastern Han : A.D. 25—214.)*

The period of roughly 450 years—broadly contemporary with the rise and full development of Roman power in the West—covered by the short-lived Ch'in and the long-lived Han dynasty is from several aspects the most decisive and important in the whole history of China, prior to the drastic reconstruction of very recent times. In this period the form and organization of the Chinese political entity and equally the structure of Chinese society were established on a basis which underwent little material change until the present century. In this period too the frontiers of China Proper against the growing menace of the steppeland nomads were defined, the foundations of the Chinese Empire laid and the general character and objectives of foreign policy determined. In many vital respects the work and achievements of the two dynasties were complementary and can therefore be considered together. At the same time it must be noted that they were animated by a very different spirit and are very differently regarded by the Chinese. The Ch'in dynasty is the most detested, the Han one of the most respected and honoured in the annals of China. In broad terms the Hans made tolerable to the Chinese the most essential of the drastic administrative changes which the Ch'in introduced and reconciled the new with the old order.

*The Ch'in Dynasty (Fig. 108)*

As noted in the final paragraph of the last section, the rulers of Ch'in had broken away from the traditions of feudal China and worked out in their own state changes and reforms which were ruthlessly imposed upon China by Shih Hwang Ti after his conquest of the whole country. There is a certain analogy in the imposition of Prussian institutions and methods on the German Reich in the time of Bismarck. Of these changes the most important were the drastic curtailment of feudalism, the virtual elimination of the old princely families and the concentration of power in a centralized state. The omnipotence of the state was a cardinal doctrine of the

Ch'in regime, and the doctrine of totalitarianism was fully exemplified both in theory and practice. As another vital element in the change, the peasant farmers—then, as now, far the most numerous class in the community—ceased to be serfs on feudal

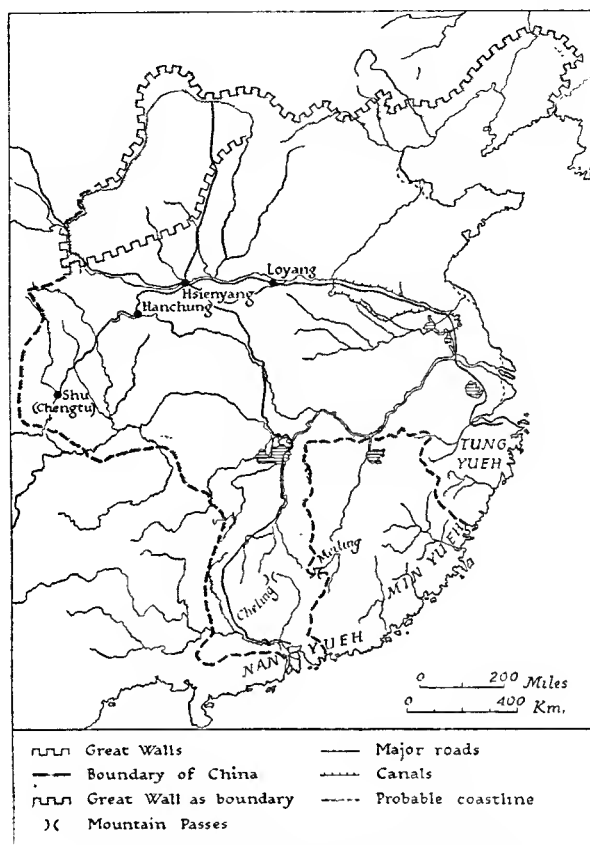


Fig. 108. The Ch'in dynasty, 255-206 B.C.

Based on Hermann, A., *Historical and Commercial Atlas of China*, pp. 18-19 (Cambridge, Mass., 1935).

estates and were assigned land of their own but on condition of both civil and military service to the state, the former illustrated on a vast scale by the colossal amount of labour employed in building the Great Wall. The 'First Emperor', indeed, probably prompted by his minister Li Ssü, to whom much of his policy is ascribed, attached great importance to agriculture, and under both the Ch'in

and the Han vast areas of land were reclaimed by state-aided irrigation works and big schemes of colonization carried out, often involving the forcible removal from one region to another of large peasant populations. Works on agriculture, as also on medicine and technical subjects, were specially exempted from conflagration in the notorious edict for 'The Burning of the Books' which were largely in the form of bamboo slips (213 B.C.).

It was this infamous edict which has earned for Shih Hwang Ti the execration of all succeeding generations of Chinese. No people has ever attached such importance to the written word, to the record of the things of the mind, as the Chinese. Their literature is one of the richest in the world, but, although much was saved, a considerable part of the literary heritage from the preceding 'Classical age' was undoubtedly lost in the imperial bonfires as well as in the destruction of many cities in the wars which preceded the establishment of the dynasty. The Chinese classics in their existing form are based to a considerable extent on the re-editing and interpretation of the Han scholars.

What were the motives of this edict? Partly no doubt to emphasize the complete break of the new regime with the feudal past and to blot out its memory, and partly to undermine the influence of the Confucian scholars whom the First Emperor distrusted, not only because they tended to uphold the old order but because they stood for the kind of criticism which a totalitarian regime finds intolerable. It was in its attitude to the scholar class and to the cultural traditions of China that the succeeding Han dynasty differed most profoundly from Ch'in.

### *The Han Dynasty (Fig. 111)*

The First Emperor's search for an elixir of life is notorious, but in fact his span was relatively short and his dynasty survived him by only a few years. It collapsed amid a welter of palace intrigue, revolt and civil war. Out of the chaos, which involved a terrific destruction of human life, emerged the new dynasty of the Han, founded by Liu Pan, a successful general of humble origin who also had the instincts of a statesman. During the disturbances attempts were made to revive some of the feudal states.

The early Han rulers moved cautiously. They tolerated for a time the feudal fiefs in a modified form, but brought them under effective supervision and maintained and extended the Ch'in scheme of administrative divisions (provinces) under bureaucrats directly



and the 'Former' Han, like the early Chous before them, maintained the imperial capital, the vast majority of the population still lived. But a comparison of the mapped distribution of population (Figs. 109, 110) shown by the 'Former' Han census of A.D. 2 and the 'Latter' Han\* census of A.D. 140 (imperfect though the returns certainly were) shows the gradual spread southwards into the valleys of the great southern tributaries of the Yangtze and the rapid colonization of the Chêngtu Plain. The welding of north, central, central-south and western China is reflected in the relatively high degree of linguistic uniformity in these very diverse regions, embracing approximately two-thirds of the area of China Proper.

### *The Conquest of South-East China*

It is often said that China has grown and achieved her immense proportions by the pervasive force of her civilization and not by the prowess of her arms. In this contention there is a large and important element of truth. It is certainly the assimilative power of her civilization which has overcome the difficulties presented by the widely different geographical environments included in the Chinese entity and has given a common cultural consciousness to people of diverse ethnic and social antecedents. But her rulers have sometimes pursued an imperialist policy, and this is emphatically true of both the Ch'in and the Han.

The initial conquest of south-east China, the hilly country of the existing coastal provinces of Chekiang, Fukien and Kwangtung, was achieved by their imperial armies. It was begun by Ch'in but completed and, except in the case of Fukien, made effective by Wu Ti of the Han dynasty in a series of campaigns (112-110 B.C.). The ethnic composition of the peoples of this region is discussed elsewhere (see pp. 414, 417 and Fig. 108). They were known to the early Chinese as the *Yueh* tribes; those of the area corresponding to the modern Chekiang were the *Tung yueh* (eastern), of the area corresponding to Kwangtung the *Nan yueh* (southern), and of that

\* The continuity of the Han dynasty was actually broken for several years by a famous usurper named Wang Mang, who established a dynasty which he called *Hsin* or 'New'. He attempted some very drastic reforms, including an ambitious scheme of land nationalization. Opposition culminated in his murder and the Han dynasty was restored in A.D. 25, but with its capital moved eastwards to Loyang; hence the term 'Eastern Han' for the 'Latter' phase of the dynasty. As Wang Mang's attempt to found a dynasty ultimately failed, it has never been officially recognized as such, and the period covered by the usurpation is reckoned as part of the 'Western (Former) Han'.

corresponding to Fukien the *Min yueh*. The Tung yueh, adjacent to the Yangtze delta, which was now being rapidly developed, were comparatively easily assimilated and many were transported to colonize the lake region of the lower Hwai. The Nan yueh, whose country was approached by the historic Cheling and Meiling passes

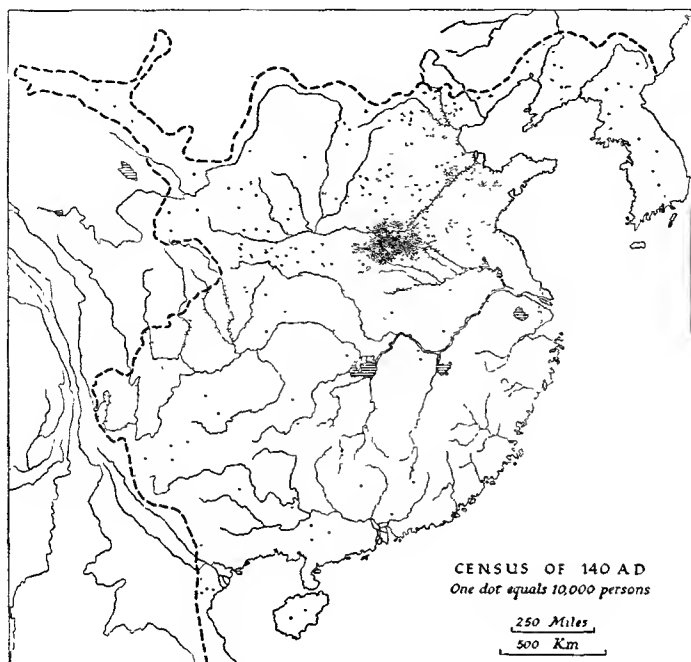


Fig. 110. Census of A.D. 140

Based on Roxby, P. M., 'China as an Entity', in *Geography*, vol. xix, p. 8 (London, 1934), compiled by Wan Kwoh-ting from the statistics of the Han census records.

from the southern Yangtze basin, were the ancestors of the Cantonese. By the time of the T'ang dynasty (A.D. 618-907) they had entered fully into the Chinese cultural heritage, and the Cantonese often call themselves 'Sons of T'ang' with the same kind of implication as that of the corresponding term 'Sons of Han' used, as already explained, by the northern Chinese. But the difficult country of the Min yueh (Fukien), walled-off from the Yangtze basin by very formidable forest-clad mountain ranges and accessible only by sea, was not effectively subdued by the Han, and the more inaccessible parts long sheltered tribes barely touched by Chinese civilization.

To this day the Fukienese dialects are the least intelligible to other Chinese (see p. 115).

It should be noticed that the water-parting ranges between the Yangtze basin and the streams flowing independently into the East and South China seas correspond closely to the linguistic divide between the Mandarin and the non-Mandarin dialects, but the Wu dialects of Chekiang have been greatly influenced by Mandarin. Cantonese is believed to resemble the form of Chinese spoken in T'ang times (i.e. before Mandarin had developed in the north).

### *The Late Incorporation of South-west China*

The greater part of China Proper was thus incorporated in the Middle Kingdom in the Ch'in-Han period. The one important exception was the wild Yunkwei tableland of the south-west, lying to the south of the Red Basin of Szechwan and west of the corridor valleys of the Siang and Kan, which formed the principal avenues of Chinese colonization towards the south. The commercial importance of this south-western region to China was early realized, for through it ran the routes to northern Indo-China and India to which the initial development of the technique of rice cultivation in the Red Basin probably owed a great deal. The feudal state of Ch'u sent military expeditions into Yunnan and towards Burma to control these routes as early as the fourth century B.C. This example was followed by both the Ch'in and the Han, and some military colonies of Chinese from the north were established among the aboriginal tribes. But no effective control was obtained until a much later period. A large non-Chinese state of Shan affinities called *Nan Chao*, covering much of what are now the provinces of Kweichow and Yunnan and extending into the northern parts of the modern Burma and Siam, maintained its autonomy for many centuries, and was not finally defeated and annexed to China until 1253 in the time of the Yuan (Mongol) dynasty.

### *The Nomad Frontier and the Foundations of the Chinese Empire*

Until the beginning of the modern period of European contact and pressure, China's external relations were mainly dominated by the struggle with the pastoral nomads of Interior Asia. It was this which shaped her foreign policy, and it also had immense repercussions on the life of China itself. The expansion of the Chinese agricultural technique towards the north-west was limited by the availability of water for irrigation. The critical margins of the arid

core of Central Asia are reached from the Chinese side in a zone extending from the mountain chains defining the Tibetan tableland (the Nan shan) north-eastwards along the outer edge of the Ordos desert into the hills of Jehol and western Manchuria. This 'dry

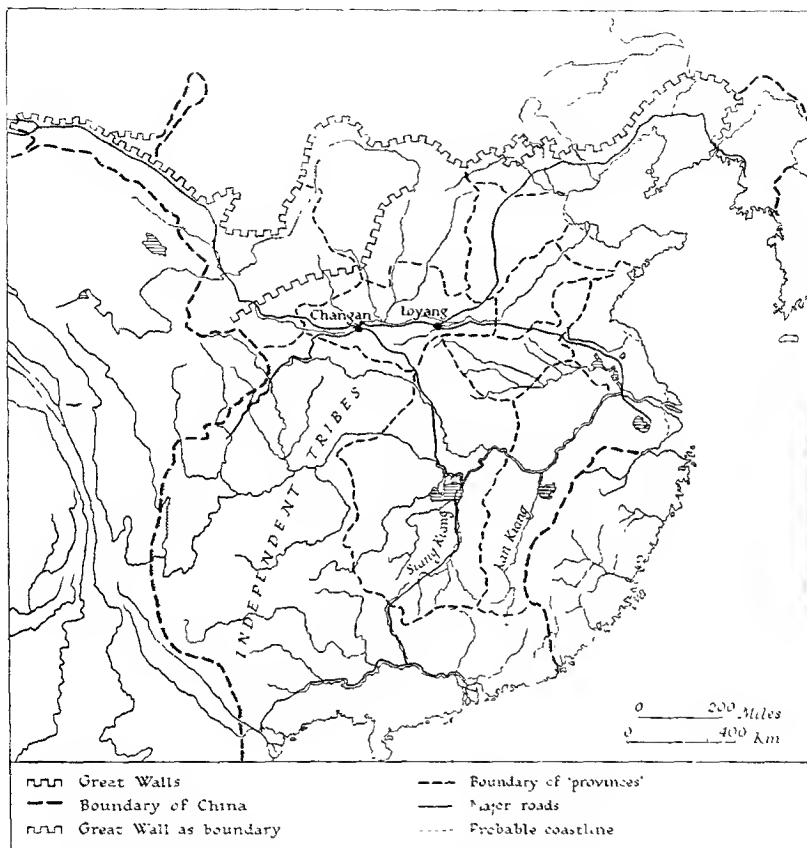


Fig. 111. The Han dynasty, 206 B.C.-A.D. 214

Based on Hermann, A., *Historical and Commercial Atlas of China*, pp. 22-23 (Cambridge, Mass., 1935).

front' is, however, penetrated by the vitally important Kansu corridor which gives access from the Wei ho valley via Lanchow, where the upper Hwang ho is crossed, to the discontinuous belt of rich oases lying at the northern foot of the Nan shan and so round both margins of the desert basin of the Tarim (Chinese Turkestan) to Kashgar, the key to the passes through the Pamirs and to western Asia. From that remote antiquity when cultural

influences from Mesopotamia probably stimulated, as we have seen, the early development of her civilization, down to her reliance on supplies from Russia in her struggle with Japan, the Kansu corridor has always been China's lifeline to the west.

There are many references in the feudal period to barbaric pastoral tribes on the western borders and even within the loess plateau. But as time passed the distinction between the Chinese mode of life, based on intensive agriculture, and that of the pastoral tribes, whose strength lay in their herds and their mobility of movement, became more marked. Two rival and alternative economies developed in the critical transition zone between 'the steppe and the sown'. Pastoral nomadism became a system and worked out its own technique of warfare, and this became increasingly formidable after the invention of the stirrup, which made accurate archery on horseback possible. By the Ch'in-Han period the first large-scale confederacy of pastoral tribes had come into being and was known to the Chinese as the *Hsiung Nu*. It was in conflict with these that the Ch'in state acquired its military strength. Local walls to protect the territories of the border agricultural states against nomad forays had been built earlier by feudal princes, but it was Shih Hwang Ti who combined and extended these into the colossal scheme of frontier defence known as the Great Wall of China. It extends from the point where the Jehol hills almost reach the coast at Shanhaikwan ('gate 'twixt mountain and sea'), at the extreme northern apex of the North China Plain, across the barrier ranges of the Peking Grid and the southern border of the Ordos desert, within the great loop of the Yellow river, to the borders of the Tibetan mountains in Kansu. It corresponds very closely to the natural divide between 'the steppe and the sown', but the Wall as seen today deviates in places from the original course, and the most spectacular portion of it, defending the passes which give access to the Peking embayment, dates from the Ming period.

The Han policy towards the whole problem presented by the menace of the steppeland tribes was planned on very bold lines. In this policy, which was initiated by the Emperor Wu Ti, the Great Wall was conceived as an inner line of defence delimiting China Proper, but the authority of the empire was to be extended far beyond it both to the west and the north-east (Fig. 112).

In the west a series of successful campaigns by Wu Ti's generals against the *Hsiung Nu* resulted in driving through a Chinese wedge along the belt of oases already mentioned as far as the Yu-mên or

Jade Gate, where the caravan routes diverge at the eastern edge of the Takla Makan desert within the Tarim depression. The Great Wall was extended north-westwards to protect this vital corridor from attack from the north. Garrisons were established at critical points along the Wall and soldier colonists settled in the oases. The curious panhandle of the modern province of Kansu, which carries China Proper far into the interior, is a legacy of this achievement of the Han generals.

This corridor leads directly to the region which we know as Chinese Turkestan, with the two routes round the north and south of the Takla Makan which converge at Kashgar. Over this region also, including Kashgar, Chinese authority was established by Wu Ti. In general, Kashgar and the Pamir passes which it controls mark the extreme limits of the Chinese empire as ruled by the greatest of its dynasties, but Han imperialism penetrated still farther west. One of the most outstanding figures in Chinese history is Chang Ch'ien, a general sent by Wu Ti on a series of notable missions to west-central Asia, until then almost completely unknown to the Middle Kingdom. His first mission took place early in Wu Ti's reign (138 B.C.), before China had secured control of the corridor to Turkestan. Its object was to seek an alliance with a people, probably of Iranian origin, known as the *Yueh Chih*, who had been driven westwards by their enemies, the Hsiung Nu. The latter captured Chang Ch'ien and held him prisoner for ten years, but eventually he escaped and reached the rich oases of Ferghana ('Ta Yuan). Thence he was directed to Bactria ('Ta Hia) and the Bokhara region, where the Yueh Chih were now established in the Trans-Caspian plains, which had been conquered by Alexander the Great two centuries before and had subsequently been ruled by dynasties of Greek origin. The Yueh Chih were not willing to make the desired offensive alliance with China to turn the flank of the Hsiung Nu. But the consequences of this mission were of signal importance. Chang Ch'ien did not return to China empty-handed. He brought back with him the seeds of the vine and alfalfa, of great importance as fodder for horses, and possibly other products, but above all he brought carefully collected geographical information which permanently widened China's horizon and resulted in new contacts. It stimulated Wu Ti to a definitely forward policy in Central Asia.

China's control of the Kansu corridor and the Lop nor region was now firmly established by the campaigns already mentioned

and the western Hsiung Nu were driven to the north. The way was then clear for an exchange of embassies or trade missions between China and the various peoples and courts with which Chang Ch'ien had made contact or about which he had collected definite information. Not all of these were successful, but the general result was to give China great prestige in Central and Western Asia, to open up new avenues of trade and, perhaps particularly, to familiarize many peoples with the value of Chinese silk. Its fame spread to the Mediterranean, and it was the silk trade

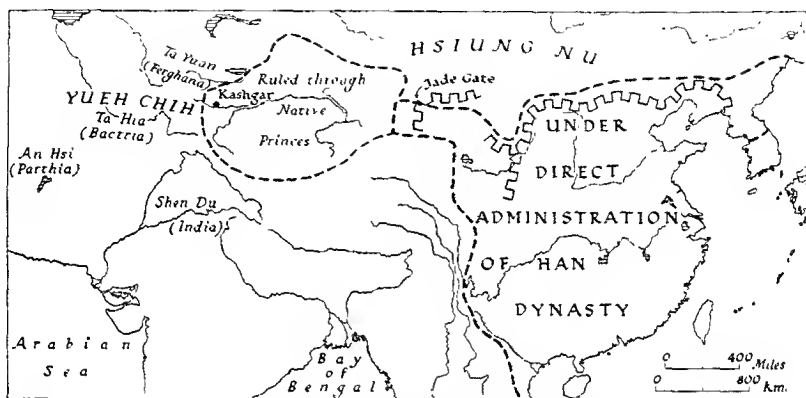


Fig. 112. The Han territories in Asia

Based on (i) Hermann, A., *Historical and Commercial Atlas of China*, pp. 26-27 (Cambridge, Mass., 1935); and (ii) Drake, F. S., 'China's North-West Passage: a Chapter in its Opening', *Journal of the North China Branch of the Royal Asiatic Society*, vol. lxvi, p. 43 (Shanghai, 1935).

between China and the Roman world which established the first definite, though indirect, connection of the Middle Kingdom with Europe.

The repercussions on Chinese civilization were considerable. Some knowledge of Hellenic science and arts now reached China from Bactria, but perhaps the most important result of the new contact with Central and Western Asia was to facilitate intercourse with India, which up to this time had been to China almost completely a '*terra incognita*'. The Han expeditions to Yunnan and the south-west, to which reference has been made, seem to have been primarily an attempt, made on the advice of Chang Ch'ien, to open up a new trade route via India with Bactria, but the immense topographical difficulties of this region vetoed its success. Later, after the corridor to Central Asia had been secured, Indian influences

began to reach China from the north-west and so to affect the imperial capital of the Han which lay right in their path. Among these influences was Buddhism. This in the time of the Han was becoming the dominant religion in the lands of Central Asia with which direct contact had been established and was destined to be by far the most important exotic element in the total complex of Chinese civilization (see p. 388).

The menace to China from the steppeland tribes has come from the north-east as well as from the north-west. In this direction the rich Manchurian grasslands have often been one of the chief gathering-grounds of nomadic or semi-nomadic organizations and a *point d'appui* for attack on the North China Plain. The corridor of the Liao valley between the Jehol hills on the west and the east Manchurian highlands on the east has corresponded in importance to the Kansu corridor. This danger, too, was envisaged in the frontier policy of the imperial Han. The kingdom known as *Ch'aohsien*, whose name survives in the modern Chosen (Korea), and which then covered an area embracing the northern portion of Korea and much of southern Manchuria, was brought into complete subjection by Wu Ti. Chinese colonization was encouraged in south Manchuria beyond the Great Wall, and the defences known as 'The Palisades', intended to protect the settled area from attack from the drier grasslands beyond, may be considered as an extension of the Great Wall, analogous to the prolongation of it north-westwards to protect the Kansu corridor. Thus the Chinese claim to sovereignty in Manchuria goes back for 2,000 years and that of suzerainty over Korea was not abandoned until the Sino-Japanese war of 1894-5.

#### V. BETWEEN THE HAN AND THE T'ANG DYNASTIES: 'THE AGE OF CONFUSION': NOMAD PENETRATION AND INTERNAL DISRUPTION. THIRD TO SIXTH CENTURY A.D.

It has been said with great truth that in the four centuries of Han rule 'the China of the next two millenniums' was born. The foundations had been laid so well that neither disintegrating tendencies from within nor repeated nomad penetrations from beyond the Great Wall were able to destroy them. The concept of the cultural unity of the Chinese world had been firmly established in men's minds and, although several centuries were to pass before it was again expressed in a political form, there was always the



assumption that this would be eventually achieved. It is important to make this generalization because the degree and character of Chinese 'disunity' have so often been misunderstood in the West. The Han effected for China what Rome effected or seemed to effect for southern and western Europe, although the culture on which they based their political structure was more homogeneous in its origins. So, too, there is undoubtedly a strong parallel between what happened in China after the collapse of the Han dynasty and the fate of Europe in the almost contemporary period of the decline and fall of the Roman Empire and the Dark Ages which supervened. In both cases the disruption and chaos were partly due to divisive forces from within and partly to a flood of barbarian invasion from without. In both cases, too, the barbarians felt the glamour of the civilization which they conquered and tried in different degrees to assimilate it. In Europe as in China the theory of unity long survived and found an equivalent expression in the concept of Christendom, which meant so much to many medieval minds. But in China the continuity of learning and scholarship was never broken, the essential culture remained and the final results were very different. The theory of unity retained its tenacity and, after long periods of disruption and partition, was always in the end politically vindicated. In Europe the theory of unity, after the vain attempt to give it political expression in the Holy Roman Empire, gradually weakened and was replaced by one of a very different character. In modern Europe there are many nations, in modern China there is only one.

*'The Age of Confusion'*

The four-centuries after the fall of the Han well deserve the title of 'The Age of Confusion'. The decline had begun in the later phases of the Eastern Han with the waning vigour of the royal house. The causes of the chaos which followed were of the same character as those which operated in somewhat similar periods later. Upon the energy and vigilance of the emperor the efficient working of the whole imperial system in China always depended to a very considerable extent, and with it the adequate defence of the frontier against the nomads. But at this stage the civil service was not as fully organized as it later became under the T'ang dynasty, and power could more easily be seized when imperial control was relaxed. The old aristocracy—the *chün tzŭ*—had almost ceased to exist as an hereditary territorial nobility, but many

powerful families had emerged out of the 'new aristocracy' of learning, and army officers as well as scholar officials were recruited from them. The weaker emperors came increasingly to rely on the advice of palace eunuchs who became the curse of the Chinese as of

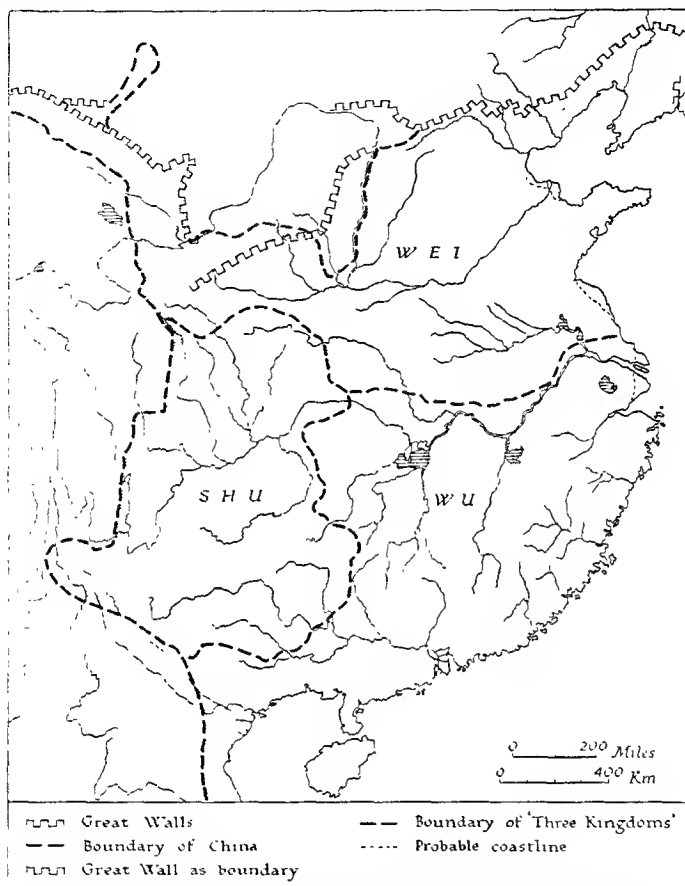


Fig. 113. The 'Three Kingdoms' in the third century A.D.

Based on Hermann, A., *Historical and Commercial Atlas of China*, p. 25 (Cambridge, Mass., 1935).

other eastern courts. Thus as the dynasty weakened there ensued a scramble for power which led first to the disruption of the Empire and then to large-scale invasion by nomad hordes waiting for their opportunity.

The first phase was the division of the Empire into the 'Three Kingdoms' (A.D. 221-265), broadly corresponding to three of the

ancient historical regions : *Wei* in the north, i.e. the old *Chung-yuen* together with the Wei ho valley, and with its capital at Loyang ; *Shu* in the Red Basin of Szechwan, with its capital at Chêngtu, and *Wu* in the lower Yangtze valley and the south-east coast, with its capital at Nanking. This period is chiefly remarkable for the tremendous impression which its conflicts made upon the popular imagination. The exploits of the many famous warriors which it produced are immortalized in the greatest of the historical romances of old China, the *San Kuo Chih Yen I*, or 'Romance of the Three Kingdoms', and one of them, Kuan Yu, was later accorded—what Confucius never received—the honour of divinity, under the name of '*Kuan Ti*' (Fig. 113).

After this phase confusion reached its climax in the period of the 'Six Dynasties' or of the division between the North and the South. Of this it must suffice to make the generalization that short-lived and often rival dynasties of Chinese origin ruled in the Yangtze valley and the South while several Tartar kingdoms were established in the North. There then began a large-scale southward migration of the wealthier and more highly educated families from the ancient cradleland of Chinese culture in the basin of the Yellow river to that of the Yangtze, which in the time of Ssü-ma Ch'ien, the Han historian, was clearly considered to lie on its fringes. This southward shift of the focus of Chinese civilization was further accentuated in the long period of Tartar pressure after the T'ang dynasty, and by the time of the Sung dynasty it was definitely centred in the Yangtze valley.

The North, however, never ceased to be primarily Chinese in culture, for the invading nomad hordes, even when they established dynasties of their own, absorbed it, sometimes unconsciously but often with set purpose. This applies both to the earlier groups of Hsiung Nu origin, some of whose chiefs had taken service under the Han and sometimes claimed legal descent from them, and to the later comers from the more recently formed tribal confederations of Turkish and Mongol affinities who now began to invade North China. Thus, to take one notable example, the T'u Pa (or Toba), a people probably of proto-Mongol or Turkish origin, who established one of the longest-lived dynasties known as the Northern Wei (386-534) and several shorter ones afterwards, deliberately adopted Chinese institutions and culture. Their leaders went much further than Kemal Atatürk in his 'westernization' of modern Turkey by proscribing not only their native costumes

but their native language as well, enforcing conformity with Chinese usages and family names and encouraging inter-marriage. They actively protected the frontiers against the advance of fresh hordes, controlled the corridor route to Kashgar, and were much influenced by Buddhism, which continued to spread eastwards by it into China. Many of these chiefs and those of other groups of steppe-land tribes, who established themselves for shorter or longer periods in the North, were patrons of Chinese scholarship and art. The descendants of all these tribes had become practically indistinguishable from the Chinese by the time the T'ang dynasty was at its height.

The 'Age of Confusion', indeed, in spite of the political anarchy, was not a period of intellectual stagnation or cultural decadence. In some ways it was more plastic than that of the Han. It was particularly characterized by the rapid spread of Buddhism, partly perhaps because the Confucian resistance to it was weakened as a result of the breakdown of the administrative machine, and partly because, in the prevailing insecurity and turmoil, it offered consolations and ways of escape which the older religions of China could not hold out. In any case it became from this time onwards a vital element in the thought and life of China. In the Middle Kingdom it developed new and important manifestations more appropriate to Chinese mentality, and it largely transformed the character of the native religion of Taoism. Thus the total cultural content of the civilization, which the T'ang dynasty was to re-unite politically, was in some respects richer than that over which the Han had ruled.

## VI. THE T'ANG DYNASTY AND THE ZENITH OF THE HISTORIC CIVILIZATION, 618-960

China was re-unified after the 'Age of Confusion' by the short-lived Sui dynasty (589-618), but it was the succeeding T'ang dynasty (618-907) which restored the greatness of the empire and resumed and expanded the role of the Han. It is frequently maintained that under this dynasty the historic civilization reached its zenith, and that in the seventh and eighth centuries of the Christian era China was the greatest empire in the world, in respect alike of the extent of its area and population, the efficiency of its government and the quality and range of its culture (Plates, 121, 122).

Several causes contributed to this pre-eminence. As always the personnel of the ruling dynasty was a vitally important factor. The

*Li* clan, from which it emerged, belonged to an old aristocratic family of North China of great administrative experience and well-established prestige. *Li Shih-min*, the real founder of the dynasty, although actually the second emperor (627-649), had some Tartar blood in his veins. Best known under his posthumous name of *T'ai Tsung*, he was, by common consent, one of the ablest, most constructive and enlightened rulers that China has known. None of his successors enjoyed an equal degree of personal respect and admiration, but several had great gifts of leadership, notably the famous Empress *Wu*, the real ruler of China in the second half of the seventh century, and *Hsüan Tsung* (712-756).

A fateful turning-point in the history of the dynasty was the great rebellion in the North of *An Lu-shan* in 755. The circumstances, discreditable to the emperor, under which this notorious Turkish adventurer attained power, and the difficulty with which the revolt was suppressed, shook the authority of the dynasty. From this time onward, while the South continued to enjoy profound peace, the North again became turbulent and out of hand. But, on the whole, the traditions of firm but enlightened rule established by *T'ai Tsung* were maintained until the later part of the ninth century.

If the personal qualities of the *T'ang* rulers counted for much in the achievements of this era, the combination of internal and external circumstances was also favourable. Chinese civilization had now reached its full maturity, but it was still vigorous, creative and receptive of new influences. It is significant that the external contacts were closer and more fruitful than they had ever been before or were destined—with one exception—to be again, prior to the modern era. In the previous section it was noted that connections with Western Asia had been maintained during the 'Age of Confusion' by the Northern *Wei*. These connections were actively developed by the *T'ang*. The early part of the dynasty coincided with the fall of the great Sassanid Empire of Persia before the rising power of militant Islam. The policy of the *T'ang* emperors was to retain control of (Chinese) Turkestan, but to refrain from interference in the conflict between Persia and the Arabs. Their relations with both were friendly. On the one hand members of the dispossessed royal house and other Persians were welcomed as refugees and allowed to practise their Zoroastrian religion. On the other, an embassy from the Caliph was cordially received (713), the ceremony of the *K'ot'ou* to the emperor being



Plate 156. Bronze bell with decorative ornament.  
Hanging in the temple. No. 244. Height, 21 m.

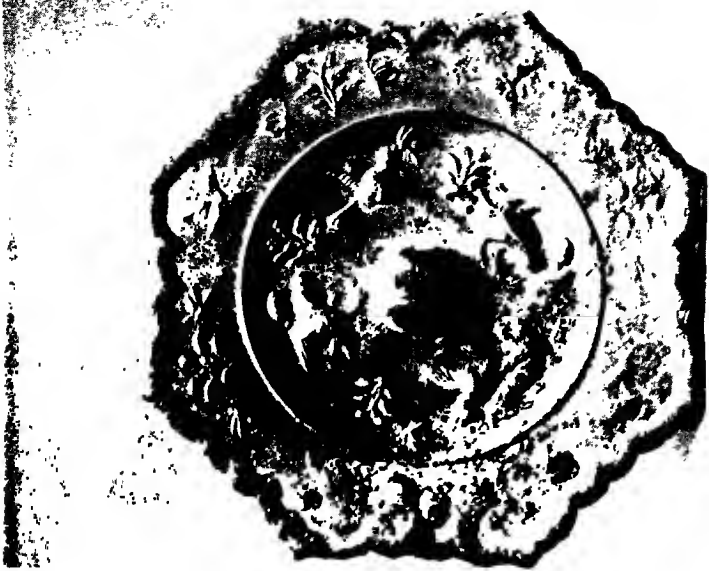


Plate 124. Bronze mirror with decorated back.  
Hanging in the temple. No. 671. Diameter, 6 m.



Plate 122 Pottery horse

T'ang dynasty. This model, decorated with rare blue glaze and touches of red paint on the saddle, represents the Bactrian horse, a type introduced into China by the Mongols.

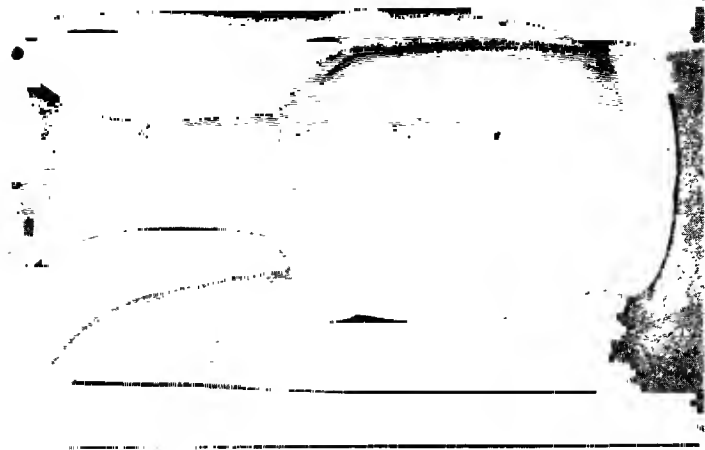


Plate 123 Porcelain ewer (*Ying ching* ware)  
Sung dynasty (960-1279) Height, 7  $\frac{1}{2}$  in.

waived in deference to the religious prejudices of the Moslems. Arab merchants began to play an important part in the external trade of China, and settled in large numbers at the rapidly rising port of Canton. Here they were allowed to appoint their own *Kadi* and to be governed by Koranic law, which has been cited as an early example of the principle of extra-territoriality.

From this period also dates the origin of the considerable Moslem population of China. The greater part of it was derived from the movement of Turkish tribes, converted to Islam, through Chinese Turkestan into the Kansu corridor and so into the western and, particularly, the north-western provinces of China Proper. For the most part they are ethnically somewhat distinct from the Chinese, and have also retained their cultural identity to a degree quite exceptional in the Middle Kingdom. This fact was recognized in the first flag of the New Republic in 1912 with its five stripes symbolizing the five 'nations' living within China (Chinese, Manchus, Tibetans, Mongols and Moslems).

In addition to the faiths of Zoroaster and Mahommed, the Nestorian form of Christianity and Manicheism, which contained elements both from Christianity and the ancient religion of Persia, both made considerable progress in China under the T'ang dynasty. After his reception of the Nestorian monk O Lo Pen, the emperor T'ai Tsung issued an edict (635) recognizing and commending his religion, and the far-famed Nestorian tablet, erected at the capital (Ch'angan) 150 years later, shows that in the interval it had spread widely. Manicheism seems to have been recognized mainly for political reasons as the predominant faith of a strong Turkish tribe, the Uigurs, on whose friendship the T'ang rulers long relied to maintain their influence in Turkestan.

T'ai Tsung's attitude and policy in these matters, followed by the majority of his successors in the dynasty, may be summarized as follows: (1) Support of Confucianism as essentially suited to the Chinese and as the soundest basis of government. This was shown in the restoration of the classics as the bedrock of administrative training (although other subjects figured in the curriculum) and the foundation of a great college for that purpose in Ch'angan. His successor Hsüan Tsung established the famous Hanlin Academy, membership of which became for centuries the most coveted of literary honours. (2) Sympathy with and encouragement of Taoism and Buddhism. This is illustrated by the great honour shown to the Chinese Buddhist Hsüan Tsang, who brought back from a



memorable visit to India a vast Buddhist literature which he was encouraged to translate into Chinese. (The popular legendary tales of Hsüan Tsang's journey will be familiar to some readers.)\* (3) Tolerance of Zoroastrianism, Manicheism and Christianity. 'The Way', began the edict of 635 commending Christianity, 'has more than one name. There is more than one Sage. Doctrines vary in different lands; their benefits reach all mankind'. Towards the close of the dynasty, however, under the emperor Wu Tsung, an ardent Taoist, occurred a sharp religious persecution directed at all faiths of foreign origin. It was of short duration, and the ban was lifted by Wu Tsung's successor. It seems, however, to have virtually destroyed the influence of Manicheism and Christianity but Buddhism, which had become woven into the texture of Chinese life and thought, gradually recovered its hold.

The generally tolerant atmosphere of the time, the new contacts and influences, particularly those of Buddhism, and the partial eclipse of Confucian traditionalism were among the favourable conditions which made the T'ang period the golden age of Chinese poetry and gave it also a very high place in the history of painting, sculpture and other arts. It was an age of romance, of philosophic speculation and even of religious mysticism, forming in these respects a marked contrast to the 'Age of Reason' which was to follow under the Sung dynasty and which was perhaps more representative of the general trend of Chinese thought.

The administrative machinery of the empire made great progress under the T'ang. The civil service was highly organized and the officials selected by public examination. There was no longer the necessity for compromise with feudalism which had handicapped the Han, and under T'ai Tsung the empire was divided into ten great '*tao*' or provinces which closely corresponded to its natural divisions and the grouping of population. Of these ten major units six were to the north of the Yangtze, three to the south and one in the west, comprising the Red Basin of Szechwan and such portions of the south-west (the later Kweichow and Yunnan) as had been incorporated, the Shan kingdom of Nan Chao, however, still stoutly maintaining its independence.

The metropolitan province based on the great capital city of Ch'angan in the Wei ho valley, then one of the most populous

\* Waley, Arthur, *Monkey* (London, 1942). Translated from the Chinese of Wu Ch'êng-ên.

and cosmopolitan cities in the world, occupied 'the land within the passes' between the three provinces of the northern plain and one which closely corresponded to the Kansu corridor, 'the road to the west'. This was still the most strategic centre for organization and control, but the cost of carrying the tribute grain from the eastern provinces by boat up the rapids of the Yellow river to support the court and the huge population of the metropolis was becoming a severe financial strain and increasingly resented. Although the small number and great size of the provinces south of the Yangtze reflected the lower density of their population, they were rapidly growing in importance, and in the time of the T'ang dynasty there was a better balance between the North and the South and a more even distribution of culture than at any period before or since. While the *tao* or provinces were the largest political units, the much smaller administrative division of the *chou* or prefecture was directly answerable to the imperial administration (organized in six ministries) in the capital. There was a much higher degree of centralization and direct control than in the later time of the Manchu Empire, when the provincial authorities had excessive power and when the difficulty of direct access to the throne by the representatives of European governments was one of the major causes of friction.

Agriculture, too, the basis of revenue and the index of contentment, was closely supervised, and strenuous efforts were made to combat the constant tendency to the growth of large estates by redistribution of land and other methods of peasant relief. The following imperial edict, which could be matched by many others, illustrates the nature of the eternal 'agrarian question', which from the earliest times down to the present day has constituted China's major internal problem :

'I (the Emperor Hsüan Tsung) have heard that some of the princes, dukes, officials and influential and rich people have frequently established great sections of fields (i.e. great estates). They have been "eating up" the poor at their will without any fear of the government regulations. . . . The result is that the poor have no place to live, having to drift around. . . . It means that some people have been robbed of their occupations and properties, and the defects and evils are plainly obvious. It is so all over the Empire and it has been in such condition for quite a long time. . . . From now on all property, no matter when and where transferred, must be restored to the original owners, if such owners still come to receive them; and the government will pay the price to the holder of such property for the poor people. Hereafter no one is allowed to sell or buy property against the government regulations'.\*

\* Lee, M. Ping-hua, *The Economic History of China*, p. 240 (New York, 1921).

The references in the first sentence of this edict call attention to the fact that, in spite of the abolition of feudalism as a system, there was still in China a privileged aristocracy, exempt from taxation. To keep it under control and the peasantry reasonably contented and protected from agrarian abuse, to maintain the authority of the central government and an efficient civil service in a country so vast and populous as China, and to prevent ambitious generals and the viceroys of the more distant provinces from acquiring undue power, was a task which demanded eternal vigilance and strength of purpose on the part of the emperor and his immediate advisers. The T'ang dynasty performed it with a large measure of success for a longer period than perhaps any other dynasty. But it never recovered full control in the North after An Lu-shan's revolt in 755 and, under a series of shortlived and sometimes weak emperors in the ninth century, revolts of generals and viceroys became frequent. The dynasty finally collapsed under circumstances very similar to those which produced the fall of the Han.

## VII. THE SUNG DYNASTY, 960-1279: TARTAR NORTH AND CHINESE SOUTH

History then repeated itself, but with significant differences. The so-called period of 'The Five Dynasties' (907-960) which followed the fall of the T'ang, recalls the earlier 'Age of Confusion', but it was of much shorter duration, and the 'confusion' was less widespread and general. The 'Five Dynasties' themselves, all of them short-lived military dictatorships, were limited to the North. The Yangtze valley and South China, although divided among a number of independent states, largely corresponding to the old regional divisions of the country, such as *Shu* (Szechwan), *Min* (Fukien) and *Nan T'ang* (Kwangtung and Kwangsi), remained peaceful and relatively well-governed, and carried on the T'ang traditions and machinery of administration. In little more than half a century the empire was again re-united with comparatively little difficulty.

The founder of the new dynasty, Chao K'wang-yin, came, like that of the T'ang, from a northern Chinese official family. He was a general, but his assumption of the title was achieved, in the first instance, not by force of arms but by the insistence of his fellows. One of his first acts after his election was to secure the disbandment of a large part of the northern armies. He then

received the peaceful submission of many of the southern states, and the coercion of the others was achieved with a minimum of bloodshed by himself or his immediate successors. The emperor's comment on the proposal of the ruler of Nan T'ang to hold his state as a feudal domain under the empire—'What crime has the land south of the River committed that it should be separated from the Empire?'—was certainly significant of the general desire for unity.

Thus by wise statesmanship was established the Sung dynasty (960-1279), which was to endure for three centuries and give its name to an era hardly less renowned in the annals of China than that of the T'ang. But its renown is of a different character.

China's external relations were now fundamentally changed. Control of Turkestan and the routes through Central Asia had been lost in the later and weaker stages of T'ang rule. During most of the Sung dynasty the critical Kansu corridor or 'arm' was held by a kingdom of Tibetan origin known as *Hsia*. But a more formidable steppeland power had appeared in the northern borderland, the strongest organization of the kind since the time of the Hsiung Nu confederacy. This was the empire of the *Khitan* Tartars of Turki-Mongol stock, who established their power over Manchuria and the adjacent parts of Jehol and Inner Mongolia, that northern steppe borderland which has so often been the *point d'appui* for attack on agricultural China. From this name Khitan comes the term *Cathay*, which Marco Polo made familiar to Europe as the designation of northern China and which was afterwards loosely and incorrectly applied to China as a whole. From it too comes the Russian name for China, *Khitai*.

During the turbulent period of the 'Five Dynasties', the Khitans had gained control of the critical passes through the Great Wall and established a foothold on the northern plain of China Proper. From this the Sung armies were never able to dislodge them, and presently the Khitans, who established what is known as the Liao dynasty, moved their capital southwards from Manchuria to the site of the present Peking (or Peiping). From this time onwards Peking begins to serve the rôle of a strategically placed metropolis, which had previously been played by Ch'angan in the Wei ho valley. The Sung capital itself was established at Kaifêng, near the point where the Hwang ho, after its emergence from the hills, begins to turn north-eastward in the alluvial plain. The two empires were evenly balanced and, by a treaty made in 1004, the

position was stabilized for nearly a century and a half, the Sung empire during this period comprising China Proper, except for the Peking embayment of the northern plain, but nothing beyond the Great Wall.

That throughout this time the Sung rulers were able to pursue a profoundly peaceful, almost pacifist policy, that population rapidly



Fig. 114. The empire of the Southern Sung, c. A.D. 1150

Based on Hermann, A., *Historical and Commercial Atlas of China*, pp. 46-47 (Cambridge, Mass., 1935).

increased, and that the eleventh century was one of the peak periods of artistic and literary achievement in China, was mainly due to the operation of a familiar process. The Khitans were becoming sinicized. They abandoned nomadism and began to adopt Chinese habits and language. In so doing they ceased to be formidable to their great southern neighbour but lost the military vigour necessary to control the tribes subject to them in the north of Manchuria (Plates 123, 124, 125).

One of these, the *Kin* Tartars from the Sungari valley, in the early part of the twelfth century threw off their authority and gradually wrested their whole empire from them. The remnants of the Khitans retired to the far west of Turkestan, and China Proper was now confronted with the more barbaric and warlike Kins, often known as 'The Golden Horde'. Their cavalry was famous, and they excelled in Parthian methods of warfare. An attempt on the part of the reigning Sung emperor to recover Peking and the country up to the Great Wall, while their struggle with the Khitans was still in progress, was followed in 1125 by the Kin invasion of North China. On the dry open plains of the northern provinces their cavalry was irresistible, but it lost its effectiveness in the moist ricefields of the Yangtze valley. The main field of conflict long continued to be the transitional region between the North and the South on the water-parting ranges separating the Hwang ho and the Yangtze and the Hwai valley to the east. This eventually came to be the uneasy frontier between the Tartar Kingdom of the North (Fig. 114) and the reduced Sung Empire of the Yangtze basin and the South. The imperial capital was moved to the far-famed Hangchow, which remains to this day an island of Mandarin (northern) speech in the midst of Wu-speaking peoples (see p. 81).

The Kins had three organizing centres or capitals, one corresponding to Mukden in Manchuria, one at Peking (then called Chungking, i.e. Middle Capital), and one at Kaifêng, the former metropolis of the Sung. This later phase of the dynasty is known as the *Southern Sung*, and it lasted for about 150 years, from 1127 to 1279, when it was brought to an end by the great Mongol avalanche, which swept away the Kins and, for the first time, submerged the whole of China under the Tartar yoke.

### *Some characteristics of the Sung Era*

The renown of the Sung era is not then due to military prowess or to further extensions of the Empire. The whole of Outer China was lost or, more accurately, never regained, and, in the second half of the dynasty's history, more than a third of China Proper was in enemy hands. The imperialism of the Han and the T'ang was replaced by a policy bordering on pacifism, and the people of the Yangtze basin and the South, which had now become the chief focus of civilization, almost completely lost the use of arms. Yet the Chinese have always regarded the Sung as one of the most

glorious periods of their history because of the greatness of its cultural achievements.

There was in this case no external stimulus, for, except for some maritime contacts which affected only the south-east coast, China was then almost completely isolated from other civilizations. But on the other hand the various new influences, and particularly those of Buddhist philosophy and art, which had freely entered the country in the T'ang period and earlier, had by this time passed through the sieve of the Chinese mind, and there was a fresh, although entirely native, re-interpretation of art and the meaning of life. This is seen conspicuously in painting and particularly landscape painting, in which art the Sung masters have probably never been surpassed. It is seen in various fields of literature, and here it may be noted that the invention of printing in late T'ang times led to a greatly increased output of books and a new literary stimulus under the Sung dynasty. But of all the many forms of intense intellectual activity which distinguished the educated Chinese world of that period the most important, so far as the future of the country was concerned, was philosophy. It was then that Confucianism, re-interpreted by a series of great thinkers, of whom Chu Hsi (1130-1200) was the last and greatest, received the form and meaning as a philosophy of life which dominated the mental attitude and outlook of the *literati* down to modern times and is still a very potent force. Of this a brief account is given in the succeeding chapter. Here it must suffice to say in the words of one of the most representative thinkers of contemporary China: 'The significance of the Neo-Confucian movement (of the Sung period) lies in the attempt to reconstruct the Classical Past as a new foundation for a secular philosophy, a secular education and a secular civilization to take the place of the Buddhist-Taoist civilization of medieval China.'<sup>\*</sup>

In quite a different sphere the Sung era is memorable for a great economic experiment which has a unique interest for the China of today. One of the Sung emperors, Shên Tsung (1068-1085), supported the efforts of his minister Wang An-shih drastically to reform the agrarian system which, as already emphasized, has always been and still is China's major problem, on the solution of which her future largely depends. Wang An-shih's reforms were no doubt intended quite as much to improve the financial and

\* Hu Shih, 'Religion and Philosophy in Chinese History' in Zen, Sophia H. Chen (ed.), *Symposium on Chinese Culture*, p. 55 (Shanghai, 1931).

economic position of the state as to ameliorate the condition of the peasants, although in fact the two objects were identical. They amounted to a form of state socialism, even though that phrase would have little meaning for the times in which he lived. The state was to take an active part in the management of agriculture, industry and commerce. The costly and unpopular system of sending tribute grain immense distances to the capital, so that it might be sold for the benefit of the imperial exchequer, was abolished. In its place taxes were to be paid out of local produce, and the surplus used to provide against the needs of the region in famine years or transported elsewhere by the government to relieve distress. A graded income tax, based on a new land survey, was imposed to provide money for the construction of public works, this taking the place of compulsory labour service. Tribunals were set up to fix prices and limit profits. A militia enlistment act was enforced to provide a regular trained army for the defence of the empire, and in the northern provinces each family was required to keep a horse—supplied, together with fodder for its upkeep, by the state—in order to combat the inferiority of China to the Tartars in the matter of cavalry. But the most important measure, going to the very heart of the problem of rural China, was the provision of state loans to the peasants at moderate rates of interest. These were made at the time of sowing, on the security of the crops, and had to be repaid when the harvest was gathered. The object was to destroy the system of usury, which has always been the curse of the Chinese countryside. Accompanying these economic enactments were complementary changes in the subjects prescribed for the civil service examinations, designed to encourage interest in and familiarity with current economic problems.

These radical 'New Laws', for which, however, Wang An-shih claimed classical precedents, were in force for several years, corresponding to part of the reign of William the Conqueror in England. Naturally they encountered uncompromising resistance from vested interests, and judgment as to the extent of their success is difficult owing to the prejudiced accounts of conservative historians. But the state banks and the system of rural credit introduced in recent years by the National Government of Republican China mark a return to their fundamental principles.

Wang An-shih belonged to the group or party known as 'The Innovators', who in the Sung era fought a protracted and, in the end, a losing battle with the orthodox 'conservatives'. The



traditional Western view of the old civilization of China as excessively conservative is much truer of the Ming and Manchu regimes than of the long period from the Chou to the end of the Sung dynasty.

#### VIII. THE MONGOL CONQUEST AND THE YUAN DYNASTY, 1279-1368

It is beyond the province of this sketch to discuss the origins and development of the mighty Mongol Empire as a whole. From small beginnings as a confederacy of steppeland tribes in Outer Mongolia, welded together by Genghiz Khan, the 'Universal Emperor' (born about 1155, elected Great Khan 1206, died 1227), it expanded in the course of three generations into the greatest land-empire which the world has ever seen, extending at the death of Mangu, grandson of Genghiz, in 1259 from the Hwang ho to Central Europe and from the Persian Gulf to Siberia. The earlier stages of this conquest, which included the destruction of the Kin Empire in North China and Manchuria (completed by the fall of Kaifêng in 1233), of the Tibetan kingdom of Hsia in the Kansu corridor, of the famous Abbasid Caliphate, centred at Bagdad, and the ravaging of South Russia, Poland and Hungary, have never been excelled, even in the twentieth century, for ruthless efficiency and barbaric ferocity. Fortunately for the Sung realm of Central and South China, its conquest and incorporation within the Mongol Empire came in the later and relatively mild stage when more attention was being paid to the fruits of victory.

The Sung Empire owed this comparative immunity from the orgy of massacre and destruction which overtook North China and the oasis cities of Central Asia and Mesopotamia, partly to the preoccupation of Genghiz and his immediate successors with the West, and partly to the screen of states, particularly the Kin Empire and Hsia, which protected it from the first Mongol onslaughts. It was not until these and also the Shan kingdom of Nan Chao in what is now Yunnan had been absorbed that the conquest of Central and South China was systematically carried out from bases in Szechwan and the south-west. It was mainly the work of the famous Kublai Khan, who succeeded his brother Mangu as Grand Khan in 1258. His succession was disputed and it was not for some years that he could give undivided attention to the task. The surrender of the imperial capital of Hangchow in 1276 marked the end of effective

resistance, but his accession as Emperor of China and the foundation of the Yuan dynasty are dated from 1279 when the commander of the last Sung armies drowned himself and the last child emperor in the sea.

Kublai was now Grand Khan of the entire Mongol Empire (Fig. 115), his authority extending in theory, and to a considerable extent in practice, over the subordinate Khanates of Central Asia,

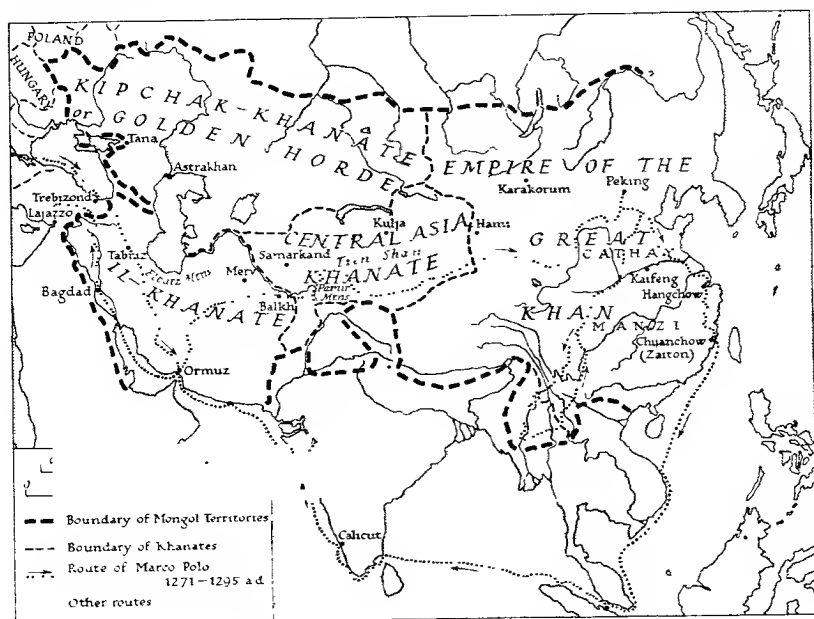


Fig. 115. The Mongol empire, c. A.D. 1300

Based on Hermann, A., *Historical and Commercial Atlas of China*, pp. 50-51 (Cambridge, Mass., 1935).

of Persia and Mesopotamia (the Il-Khanate) and of South Russia (the Kipchak-Khanate or Golden Horde). But that he considered China the richest prize which the empire offered is shown by his removal of the imperial headquarters from Karakorum near Urga in Outer Mongolia to Peking (the Cambaluc of Marco Polo). From this strategic point he could both draw upon the main breeding-ground of the men and horses on which his military strength was based, and also watch and overawe the conquered agricultural civilization to the south. As time passed, Kublai's role as Emperor of China tended to become more important than his role as Grand Khan of Tartary, and the conversion, within twenty years of his

death in 1297, of the western Khans to Islam meant that the authority of his own Buddhist successors in the Yuan dynasty was no longer recognized.

### *Consequences of the Mongol Conquest of China*

The consequences for China of Mongol conquest and rule for nearly a century were profound and lasting. To appraise them we must to some extent discount the great glamour with which Marco Polo's descriptions have invested Kublai Khan himself and his government of the country. Kublai is without question an outstanding figure. He had the vigour and energy of his stock without its barbarism, and he combined capacity for administration and strength of purpose with intellectual curiosity and appreciation of the civilization which he had conquered. In religious and cultural matters he was singularly tolerant, although not more so than many of the T'ang and Sung emperors had been before him. His employment of Marco Polo and many other foreigners in government service was probably both a matter of policy and of impartial recognition of merit.

The establishment of order and of a wonderful system of imperial posts, linking East and West all across Central Asia, was another striking achievement. During the 'Pax Tartarica', which lasted for three-quarters of a century, travel from Europe to China, both for the emissaries of the Christian religion and for traders, became relatively safe and practicable. So late as 1340 a merchant's handbook, compiled by Pegolotti of the Florentine trading house of Bardi, could state: 'The road you travel from Tana (on the Sea of Azov) to Cathay (North China) is perfectly safe, whether by day or night, according to what merchants say who have used it'.\* One of the chief routes was from the port of Lajazzo on the Gulf of Alexandretta, or from that of Trebizond on the Black sea, to Tabriz, the gate-city of Persia, and thence south of the Elburz mountains to Merv and Samarkand and on to Kulja, whence led the famous caravan route north of the Tien shan barrier (the Pe-lu) via Hami to Peking. At a later stage this was shortened by the more direct route from Tana via Astrakhan to Kulja. Alternatively, the route could be taken from Merv via Balkh, through the Pamir passes to Kashgar, and then either by the oasis belt south of the Tien shan (the Nan-lu) or along the similar

\* Power, Eileen, 'The Road to Cathay' in Newton, A. P. (editor), *Travel and Travellers of the Middle Ages*, p. 144 (London, 1926).

belt to the north of the Kun lun. These routes linked up with the northern (Kulja) route to the south of the Gobi desert. A slower route, taking about two years, but one followed by several travellers, was that across Persia to Ormuz on the Persian Gulf, and thence by sea to Calicut on the Malabar coast of India, and from there by large junks to Canton or to the great port in Fukien province, which Marco Polo called Zaiton (Ch'üanchow).

Along one or other of these ways many famous travellers from the west reached and returned from China during the 'Pax Tartarica'. Among the earliest were the father and uncle of Marco Polo, whose first journey extended in all from 1251 to 1269. It was on their second journey—made at Kublai's own request—that these Venetian merchants took young Marco with them. They reached Peking (Cambaluc) by the overland route in 1275, and were again most courteously received by the Great Khan. For the next fifteen years Marco travelled extensively in China, and for three of them held an important administrative post. The result was the earliest detailed first-hand account of the Middle Kingdom accessible to Europeans. It was compiled by Marco Polo later in life, probably in a Genoese prison. With his father and uncle he had eventually returned to Venice in 1295, travelling via the sea-route to Persia, whither they escorted—another mark of Kublai's confidence in them—a Tartar princess as a bride for the Il-Khan.

This picture of the 'Pax Tartarica' is in many ways an attractive one, but it should not obscure the positive and lasting injuries which the Mongol conquest inflicted upon China. From the terrible devastations and mass slaughter of the initial stages the north-west and the Kansu corridor never recovered. The reduced population could not maintain the irrigation works on which its prosperity depended, and from this time seems to date the encroachment of the desert sands which have since covered the sites of important border cities and Buddhist monasteries. North China as a whole, as a result of its long Tartar occupation and frequent wars, had become a kind of military borderland, and there had been a general exodus of wealth and culture to the South. The contrast between the North (Cathay), with its military traditions, and the South—which he calls Manzi—with its essentially unwarlike peoples and its opulent and ultra-refined city life, very forcibly impressed Marco Polo. The magnificence and beauty of the former Sung capital of Hangchow, in particular—which by its surrender had escaped destruction—severely taxed his powers of

description, although he himself came from one of the most magnificent and opulent of European cities. To Marco Polo Hangchow was 'the fairest city' in the world.

Thus the balance between North and South, which was being achieved in T'ang times, had been profoundly disturbed, and henceforward in Chinese history there has been a certain dualism, with frequently unhappy consequences. Fortunately, it has never proceeded far enough to impair the essential unity of Chinese civilization.

More than any other steppeland people before them the Mongols, during their occupation of Chinese soil, retained their identity, although many cases of assimilation occurred. With deliberate intent the emperors of the Yuan dynasty set aside the traditional method of recruiting the civil service, and staffed the administration very largely with foreigners. Mongols themselves were seldom employed in anything but the army of occupation. Many of these foreigners, even under Kublai, were unscrupulous adventurers, and extortion and corruption became general. In the fourteenth century the civil service examinations were restored, and attempts were made to win the support of the Confucian scholars. But as the Mongol empire disintegrated and the dynasty lost its primitive vigour, the feeble successors of Kublai were powerless to cope with the increasing tide of revolt.

In less than a hundred years from Kublai's accession as Chinese emperor, the leader of one of these revolts, himself of humble peasant origin, after becoming master of the lower Yangtze valley, captured Peking and established the Ming, the last of the great purely Chinese dynasties. The tomb of this first Ming emperor, who thus rescued China from the hated Mongol yoke, is one of the most celebrated and revered monuments of China. It lies under the shadow of the Purple Mountain outside the city of Nanking, where he established his capital. More than five hundred years after his death, Dr Sun Yat-sen, the 'political father' of Modern China, who had just become provisional president of the new Republic (after the Revolution of 1911-12), came to this spot and—western-trained socialist and republican though he was—at a solemn ceremony announced to the spirit of the Ming emperor the liberation of his country from the yoke of the no less detested Manchus. Dr Sun's own mausoleum, erected by the Nanking Government as the symbol of modern Chinese aspirations, stands but a short distance away within the great National Park of China.



had maintained its independence, was now incorporated in the empire as the two provinces of Kweichow and Yunnan.

(b) The critical region of southern Manchuria known as Liaotung, which from early times had been the scene of Chinese settlement but had so often been the base of attack by nomad powers, was now included in the Chinese province of Shantung. China Proper was thus extended at certain points beyond the Great Wall (Fig. 116).

The provincial administration as developed by the T'ang dynasty was restored, but the provinces were rearranged to suit the changed distribution of population. The Ming provinces, fifteen in number (Fig. 116), correspond very closely to those of contemporary China, the most important subsequent changes being a subdivision in the central and lower Yangtze basin by the Manchus, bringing the total to eighteen, and the incorporation under the republic of new provinces carved out of the Tibetan border and Inner Mongolia (see p. 3 and Figs. 1, 2). The general grouping of population had greatly changed, as the result of the progressive colonization of the South, with, in the main, a tranquil record, and the repeated devastations of the North. The extent of the change may be approximately gauged by the following table showing the estimated percentage distribution of population in different parts of China at four widely-separated periods :

*Percentage Distribution of Population*

North-East=north of the eastern bend of the Hwang ho, i.e. Shansi and Hopeh.  
Central-East=south of the eastern bend of the Hwang ho and north of the lower Yangtze, i.e. Shantung, Honan, Hupeh, Anhwei and Kiangsu.  
North-West=Szechwan, Shensi and Kansu.  
South=All to the south of the Yangtze.

Region				' Former Han '	T'ang	Sung	Ming
				A.D. 2	A.D. 740	A.D. 1102	A.D. 1491
North-East .. ..	..	..	..	23	29	14	12
Central East .. ..	..	..	..	53	31	24	28
North-West .. ..	..	..	..	16	13	22	11
South .. ..	..	..	..	8	27	40	49

Apart from the steady growth in importance of the South, this table shows the marked decline of the north-west between the Sung and the Ming, primarily as a result of the Mongol devastations.

In Ming times, no less than in modern China, the distribution of population and wealth pointed to the lower Yangtze valley as the most appropriate organizing centre, and here, in the region

from which he derived his principal strength, Hung Wu placed his capital at Nanking, which he rebuilt on a grand scale with its immense city wall over twenty miles in length. It was probably a great misfortune not only for his dynasty but for the future of Chinese unity that, shortly after his death in 1398, the capital was moved back to the frontier city of Peking in the extreme north of China Proper. The transference was primarily due to the ambitions of the Duke of Yen, uncle of the young grandson and legitimate heir of Hung Wu. As Duke of Yen he had been in charge of the frontier defences and drew his strength from the borderland region. In spite of considerable resistance from the Yangtze provinces the usurpation was successful, and the new emperor Yung Lo (1403-1424) laid out the superb palaces and city of Peking as seen today. Usurper and 'wicked uncle' though he was, Yung Lo was a strong and effective ruler, and from this northern base, by a series of vigorous campaigns, prevented the revival of Mongol power and stabilized the northern defences of the empire. None the less the isolation of the court and central government from what were now the key economic areas and main centres of Chinese public opinion, trade and culture in the Yangtze valley and the South became, as time passed on, an increasing source of weakness and disunity. It was in the time of the later Mings that the western traders, in the form of Portuguese and Dutch expeditions, often of a buccaneering character, first appeared in the South and East China seas. The new trouble was at first no bigger than a small cloud on the horizon. That it was destined to become a tempest threatening to disrupt the very foundations of China was in part due to the isolation and ignorance of the central government in the remote northern capital and of the excessive power delegated to the local viceroys and officials of the South, who had to cope with the new emergency.

It was not until the time of the later Manchus that the challenge from Europe came to a head, but the appearance of the Portuguese and Dutch traders, followed by that of the British (Captain Weddel's expedition of 1637), was a sign of the great development and expansion of western civilization in the fifteenth and sixteenth centuries which were contemporary with the Ming era in China. In comparison with the vigour and creativeness of Europe in the age of the Renaissance and discovery the China of the Mings was relatively marking time. For the first hundred years or so it was carried forward by the old momentum from the past, but then the



disastrous effects of pedantry and formalism became apparent in art and literature. Retrogression is perhaps not too strong a term.

For this retrogression there were several reasons. The Mings stood for a national recovery from the oppressive domination of the Mongols, who had destroyed much and contributed little of value. The Chinese reaction was a result of the superiority of their own civilization and the need for protecting it from foreign control. During the Ming period itself China was again isolated on the landward side. Its earlier phases coincided with the rise in Central Asia of the empire of Tamerlane whose methods, so closely resembling those of Genghiz Khan, were illustrated by his ravaging of Persia and who at the time of his death in 1404 was preparing to invade China itself; its later phases were contemporary with the rise and development of the Ottoman empire which closed the ancient trade-routes through Western Asia to the Mediterranean.

Thus no fresh inspiration came to China by the historic overland routes, and the Mings themselves made no serious attempt to establish their authority beyond Hami, on the threshold of Turkestan. Maritime trade between the ports of south-east China and the East Indies, Malaya, India and even Arabia and the Persian Gulf continued and, under the early Mings, was considerably expanded. Several expeditions and missions were sent to the southern seas and in these regions Chinese prestige stood higher than ever before. But this contact was chiefly commercial and mainly limited in its effects to the narrow littoral zone of the south-east, whose outlook has always been more cosmopolitan than that of China as a whole. To the early European traders was due the introduction of certain important new products of American origin, reaching China by way of the (Spanish) Philippines or Malacca: tobacco, the sweet potato, maize, the peanut and pineapple.

An important new cultural influence was introduced by small groups of Roman Catholic missionaries who, in the second half of the sixteenth century, gained admission to China. St. Francis Xavier was not allowed to reach the mainland and died on an island south of Canton in 1552. But the famous Jesuit, Matteo Ricci, thirty years later, was more fortunate and, in spite of some opposition from official Confucianism, was allowed by the emperor to reside in Peking. The Mings, on the whole, did not depart from the tolerant attitude of the T'ang emperors, and the admitted proficiency and knowledge of the Jesuit Fathers in astronomy and mathematics enhanced their prestige and influence. They were

later followed by Dominicans and Franciscans, and before the end of the dynasty Christianity had again established a foothold in China. In the last days of the imperial family several members, escaping from Manchu domination, were converts to this faith.

In the main, however, China under the Mings was thrown back on her own cultural traditions and looked to the past for the main-springs of her thought and policy. Buddhism and Taoism had ceased to be really vital forces, and Confucianism, in the more rationalized form established by Chu Hsi and the other Sung philosophers, was dominant. Orthodoxy was the hall-mark of the age, and the restored civil service examinations were based exclusively on the accepted Confucian canon. Scholarship was honoured but was expected to conform to the conventions of the past. Literary activity was great but largely took the form of commentaries, essays and collections. The *milieu* was not favourable to creative thought or fresh manifestations of artistic genius, although in two fields—architecture and ceramics—the Ming age is admittedly pre-eminent (Plates 126, 134).

### *Rise of the Drama and Popular Literature*

To this picture of somewhat mediocre achievement there is, however, one significant exception. Hitherto the culture of China had been almost exclusively associated with the small *literati* class, and the high standard of artistic and literary output had been largely dependent on imperial patronage. But now in the time of the Mings the rank and file of the people began in their own way to participate in some aspects of the great heritage. There were two developments of deep interest. One had its origins in the Yuan (Mongol) dynasty probably, it has been suggested, because the Chinese scholars of that age, when the civil service examinations were suspended and court patronage of the traditional arts largely withdrawn, began to try their hands at more popular modes of expression. For whatever reasons the drama, hitherto a limited and rather conventional court art, underwent a rapid development at that period and under the Mings became the most popular and widespread of all the arts and has so remained until the present day. The Chinese drama is racy of the soil and the richly storied past, the great bulk of the plays being based on historical incidents. The stage setting is as simple as that of Shakespearean England, but the standard of acting, particularly the impersonation of female characters by men—which is prescribed by convention—is very

high. It would be difficult to exaggerate the importance of this popular drama in bringing warmth, colour and interest to myriads of remote villages. But it was characteristic of the gulf which long persisted between the orthodox circle of Confucian scholarship and the masses that the sons of actors were among the very few groups ineligible for public office.

No less important, and similarly banned by Confucian orthodoxy, was the development, during the Ming period, of the prose novel which became immensely popular and was enjoyed by some who had carefully to conceal a taste which polite society considered depraved. The novels in the first instance were often based on the time-honoured tales recounted by the professional story-tellers, who, from early times, but particularly from the age of the Sung, flourished in the towns and villages of China. Many of the most famous novels were undoubtedly the work of scholars but so disguised, under the cloak of pseudonyms or anonymity, that the task of discovering their true authorship constitutes an intriguing and difficult field of literary research in modern China. Among the most celebrated of these novels, now ranked as one of the most precious inheritances of the past, are the *San Kuo Chih Yen I* or 'Story of the Three Kingdoms', said to be the most popular book in the Chinese language, the *Shui Hu Chuan* (translated into English as 'All Men are Brothers') and the *Hung Lou Meng* or 'The Dream in the Red Chamber', written in the middle of the eighteenth century and considered by many critics as the greatest of them all. These novels were written not in the *Wên li* or classical language of scholarship, which in Ming times and long before had become a dead language, but in the *pai hua* or northern vernacular, the spoken language of the people. The existence of this vast volume of popular, but officially quite unrecognized, literature was the basis of the great linguistic reform introduced by Professor Hu Shih and other scholars in the second and third decades of the present century, whereby *pai hua* has become the 'National Language' of China (see p. 454). It remains to add that, through the wide knowledge of these historical novels and the still wider appeal of the drama, the rank and file of the Chinese people have a far more intimate acquaintance with many aspects of their history than the people of most western countries have with theirs. The extent to which the abounding historical memories and folklore of China will be able to resist the influence of the modern cinema or, conversely, to affect its character is a very interesting question.

*The Decline of the Ming Dynasty*

The collapse of the Mings was due to the same kind of combination of internal troubles and external menace as had caused the fall of earlier dynasties. After Yung Lo no outstanding ruler appeared. Secluded within the precincts of 'the Forbidden City' in far-away Peking and increasingly isolated by court etiquette from contact with the real world of China, the later emperors lost all effective touch with the people. Eunuch influence and intrigue were again rampant and court favourites were given large landed estates. The lack of control from the centre produced its usual result upon the agrarian situation, which rapidly deteriorated in the late sixteenth and early seventeenth century. The numerous reports and memorials to the throne from various conscientious officials, setting forth in detail the condition of different districts, make it clear that the distress of the peasantry at this time was never more acute, that the dynasty had completely lost the popularity which its founder had deservedly gained for it, and that the real cause of the Manchu conquest was not the strength of the invader but the despair and anger of the people (Plates 136, 137, 139).

*China's First Menace from Japan*

Trouble had been brewing for some time in the northern borderlands which Yung Lo had brought under control. It was in the second half of the sixteenth century that China experienced her first important menace from Japan. Cultural influences from the mainland, entering via Korea, had begun to reach the Island Empire as far back as the Han dynasty and continued through the 'Age of Confusion'. In the T'ang dynasty the contacts multiplied, and Japan may be said to have then come completely within the Chinese culture area, although not under her political control. The rudiments of Chinese civilization, together with the influences of Buddhism which entered with them, were skilfully adapted and combined with native customs to form the basis of a distinctive national culture. But under the T'ang and also under the Sung dynasty the Japanese 'sat at the feet' of the older civilization, and Japanese students thronged its chief cultural centres. After the Mongol conquest of China Kublai Khan twice attempted to include Japan within his vast domains (1274 and 1281), but his fleets were destroyed under circumstances which closely recall the fate of the Spanish Armada. This success stimulated the development of Japanese maritime power and, under the Mings, the raiding of the

Chinese coasts from Liaotung to south of Canton by Japanese pirates assumed alarming proportions. The raids seem to have been financed by the feudal chiefs of southern Japan to enhance their strength in the struggle for power then in progress between the rival clans.

With the unification of Japan under the famous shogun, Hideyoshi, in the late sixteenth century, the danger became menacing. Hideyoshi had a programme for a 'Greater Eastern Asia' strikingly similar to that of the leaders of contemporary Nippon. In a peremptory letter to the governor of the Spanish Philippines, announcing his intention of invading that archipelago unless homage and tribute were rendered, he remarked: 'We are now undertaking the conquest of Tai-Min (China). This step, however, is not actuated by our own inclinations, but is taken in pursuance of a heavenly command'. His armies did in fact overrun Korea, and Chinese troops, sent in response to Korean appeals for help, met with some severe reverses. The situation was saved by the death of Hideyoshi in 1598. No further attempt was then made to conquer Korea as a prelude to that of China and, not long afterwards, the Tokugawa Shogunate, through fear of the political ambition of the western powers, adopted the policy of rigorous seclusion, which sealed Japan to the outside world until the middle of the nineteenth century. Their costly and unsuccessful Korean campaigns, however, sapped the strength and prestige of the Mings in face of the new menace from Manchuria.

### *The Origin of the Manchus*

The early history of the Manchus is very similar to that of the Kin Tartars who had challenged China four centuries earlier. They came from the same homeland in the Sungari valley of northern Manchuria and belonged to the same Tungusic or mixed Mongoloid stock (see Chapter XIII). Early in the seventeenth century they were welded into a strong organization by Nurhachu (1559-1626), extended their power over practically the whole of what we now know as Manchuria and established their capital at Mukden. Before their final advance into China Proper the character of their organization underwent a considerable change. Partly by conquest but partly through voluntary submission to their authority, they incorporated into their empire many Mongol tribes who had never abandoned the hope of recovering their lost power in China. The Manchus could thus pose as the successors

of the Yuan (Mongol) dynasty and actually obtained possession of its dynastic seal. In a sense the new conquest of China was a joint Manchu-Mongol enterprise. Moreover, in the final composition of the Manchu complex, there was a considerable Chinese agricultural element from the ancient centre of cultivation in South Manchuria. Thus, in its ultimate form, the Manchu was far from being simply a barbaric steppeland power, although its military strength lay chiefly in the cavalry for which the Tartars had always been famous. It resembled rather the mixed and virile borderland organizations such as those of the Chou and the Ch'in, which in earlier times had been built up on the north-western threshold of China. The Manchus always claimed to be a legitimate Chinese dynasty, although that claim was never admitted by the bulk of their subjects.

It should be noticed that what has been said in this last paragraph is very pertinent to the understanding of the modern situation. In placing upon the throne of the puppet state of 'Manchukuo' the last Manchu emperor of China, unseated while still a child by the Revolution of 1911-12, the Japanese hoped to appeal to the Mongol population of western Manchuria by invoking the memories of the ancient Manchu-Mongol alliance and also to reconcile the dominant Chinese population to the new regime.

### *The Manchu Conquest of China*

In spite of the sources of strength just described, the Manchu armies which advanced south of the Great Wall in 1644 were far less formidable than the Mongol hosts of Genghiz Khan and Kublai Khan. It was the turmoil and civil war, which distracted and weakened the country under the later Mings, that made their progress comparatively easy. This turmoil had culminated in a great revolt headed by Li Tzū-ch'êng, the bandit son of a village headman. He made himself master of north-west China and stormed Peking in 1644. The last Ming emperor committed suicide on the famous Coal hill as he entered the city, and Li proclaimed himself the founder of a new dynasty. But he had bitterly offended Wu San-kwei, the general who commanded the Ming forces on the Manchurian frontier. The latter transferred his allegiance to the Manchus, and their combined armies heavily defeated Li and took possession of the capital, which was thus entered by different hostile forces twice within the same year. It took another quarter of a century for the Manchus to establish

their authority securely in Central and South China. Several Ming claimants had considerable followings, and some of the Chinese generals, including Wu San-kwei, who had originally supported the Manchus and had been given viceregal authority in important provinces, made their own bids for power. By about 1680, however, the whole country was pacified, and then began for China a longer period of profound peace and prosperity than she had enjoyed as a single, undivided political unit since the T'ang dynasty.

#### X. CHINA ON THE EVE OF CONFLICT WITH THE WEST. THE CH'ING (MANCHU) DYNASTY AND EMPIRE TO *circa* 1800

The *Ch'ing* dynasty, to give the Manchu regime its dynastic title, endured for more than 250 years, but it would be difficult to imagine a greater contrast than that existing between the two almost equal divisions into which it naturally falls. The first half is almost spanned by the reigns, two of them of great length, of three emperors: K'ang Hsi (1661-1722), Yung Cheng (1723-1735), and Ch'ien Lung (1736-1796). Although he retired in the latter year, Ch'ien Lung virtually controlled the direction of affairs until his death in 1799. This long period, covering the later part of the seventeenth and the whole of the eighteenth century, is characterized by almost unbroken tranquillity and a high level of prosperity within China Proper and by a very vigorous foreign policy, which extended the empire to its widest limits, and gave it an almost unchallenged authority in the affairs of central and south-eastern Asia. The second half, embracing the nineteenth and early years of the twentieth century, represents one of the deepest troughs in the long annals of China, a period of feeble monarchs and a rapidly deteriorating royal house, of profound distress and economic unrest, of a shrinking empire and growing encroachments by foreign powers, which constituted a far greater menace than any of the semi-barbaric steppeland organizations that in earlier periods of weakness had threatened the integrity of the country. It has been indeed one of China's greatest misfortunes that the new and extremely difficult problems presented by the pressure of the western trading nations became urgent and menacing just at the time when she was in the worst position to cope with them.

That these problems were foreseen by the great emperor K'ang Hsi early in the eighteenth century is indicated by a significant document giving advice to his successors. He distinguishes three groups of western 'foreigners': the Muscovites or Russians, a

north European group (Dutch and English), and a south European group (French, Spanish and Portuguese), and says of them : ' They carry out whatever they undertake, however difficult it may be ; they are intrepid and clever and make profit out of everything. As long as I shall reign there will be nothing to fear for the Chinese Empire. I treat them well ; they like me and try to please me . . . but if our government becomes weak and if the Chinese of the southern provinces are not watched, what will become of our Empire ? '

### *The Rites Controversy*

Apart from the first clash with Russia described below, the only important issue involving the West which came to a head at this stage was the controversy on the position of the Roman Catholic missionaries in China. K'ang Hsi at first maintained the friendly attitude to the Jesuits which had been shown by the Mings, himself studied western science under their guidance, used them in various official posts and in 1692 published an edict of toleration. Christianity was making slow but definite headway. But later in his reign arose an acute controversy as to whether Chinese converts to Christianity must abjure the customary rites in honour of ancestors and of Confucius. On the ground that these were primarily civil rites, the Jesuits as a whole were disposed to tolerate them, but the Franciscans and Dominicans took the opposite view and appeal was made to the Pope. His decision was long delayed and was eventually adverse to the Jesuit contention, but, long before the reply was received, K'ang Hsi laid down the principle that there must be no interference with the basic beliefs and practices of the Chinese people and that missionaries who could not accept this ruling must leave the country. Many in fact accepted it, but the Christian communities in China tended to fall under political suspicion, and there was intermittent persecution in the reigns of K'ang Hsi's successors, Yung Cheng and Ch'ien Lung. The position of the small Christian church was further weakened by the papal suppression of the Jesuits in 1773 and the growth of European scepticism in the later part of the eighteenth century. The subsequent revival of missionary zeal in the nineteenth century and the advent of the first Protestant missionaries unfortunately coincided with the beginnings of the system of European privilege in China, which increased the political suspicion of Christian converts.



*The Policy of the Early Manchu Emperors*

The treatment of foreigners by the great emperors of the early Manchu period was, however, no more than a small aspect of the major problem of the administration of China and the reconciliation of the people to their rule. To this task K'ang Hsi brought consummate ability and statesmanship, and his policy was, on the whole, maintained by his two successors. This policy to a large extent vindicated their claim to be a legitimate Chinese dynasty. In contrast to the Mongols they identified themselves, subject to certain qualifications noted below, with the national interests, maintained the traditional system of administration and, in civil posts, employed Chinese almost exclusively. Never was the position of the Confucian scholars more dominant and unchallenged. It is, however, a valid criticism of their regime that, in thus maintaining their own authority by the support of this ruling class of China, they put a premium on orthodoxy and conservatism, discouraged initiative and experiment and increased the growing tendency to cultural rigidity. Scholarship and learning were lavishly supported but moved along the old lines of interpreting the past. In this field there was, indeed, one important development in the rise of a noteworthy school of philology and historical criticism. The interpretation of the classical texts by the Han scholars (see p. 385) was now carefully and closely scrutinized, by methods closely resembling those of modern textual criticism in the West, and resulted in a considerable sifting of the true from the false. But this does not invalidate the general statement that there was little originality in thought or art and relatively little appreciation of applied science, which was making rapid headway in the contemporary West and was destined to give it an overwhelming advantage over China in the following century. For these reasons the early Manchu period in China, prosperous and brilliant as it was, cannot be compared with the T'ang and the Sung in cultural achievement (Plates 127, 130, 131, 138).

More important, however, than the appeasement of the scholars was the contentment of the peasantry. The immense improvement of the agrarian situation is the best index of the high standard of government in China in the late seventeenth and through most of the eighteenth century. The condition of the peasantry, as we have seen, had never been worse than under the later Mings; in the time of K'ang Hsi, Yung Cheng and the first half of the reign of Ch'ien Lung it was clearly better than at any other period of

Chinese history for which reliable records exist and almost certainly better than that of most European peasantries in the same century. It was primarily due to a very active policy of reclamation of waste, of flood control, land settlement and encouragement of intensive farming, as well as to frequent remission of the land tax which was made possible by skilful financial management. The high importance attached to reclamation of waste and greater intensity of production is shown by numerous edicts. 'It is the aim of the government', runs one of Yung Cheng, 'that there shall be no unoccupied or uncultivated fields in the country, that every family and individual shall have plenty and that the people and the community shall enjoy affluence'.\* At the same time the restoration of peace within China Proper and of authority over most of Central Asia brought a great increase of both internal and external trade. Disbanded soldiers were settled as colonists on a large scale in the reconquered oases and other parts of Chinese Turkestan. There is no reason to doubt the complete sincerity of the words attributed to K'ang Hsi: 'One vow I have resolutely made and that is to bestow the blessing of peace throughout this vast territory over which you have placed me'.

This long-continued high level of prosperity brought, however, the consequence, inevitable under the deeply rooted social ethics of China, of a rapid increase of population. Of the reality of this increase there can be no question, but its extent is difficult to measure owing to the problems involved in the interpretation of the numerous Chinese censuses, the basis of which often varied. The following estimates, however, are worth quoting:—

*Estimated Population of China at Different Periods*

Early eighth century	..	T'ang dynasty	..	..	..	40-45 millions
End of eleventh century	..	Sung dynasty				
		(before loss of North China)	..			70 millions
Thirteenth century	..	Yuan (Mongol) dynasty	..	..		55-60 millions
1650	..	Early Ch'ing (Manchu) dynasty	..			70 millions
1740	..	Early in reign of Ch'ien Lung	..			140 millions
1800	..	At death of Ch'ien Lung	..			300 millions

From the high total under the Sung (an era of prosperity) there was undoubtedly a big decline, due to the Mongol devastations. An increase under the early Mings was followed by a marked fall in the first half of the seventeenth century. But these fluctuations

\* Lee, M. Ping-hua, *The Economic History of China*, p. 417 (New York, 1921).

are almost dwarfed by the great increase in the first 150 years of the Manchu regime, even if it did not reach the fourfold dimensions shown in the table. That the increase was realized and watched with considerable anxiety is shown by various imperial pronouncements, particularly one of Ch'ien Lung in 1740 beginning : 'The population is constantly increasing while the land does not become any more extensive', and urging the cultivation of marginal mountainous land free from restrictions and taxation. In fact the superabundant population was destined to be one of the major factors in the disastrous economic situation of the nineteenth century when the dynasty had lost the vigour and inclination to cope with it. It was also one of the most serious problems inherited by the Chinese Republic.

*The Chinese Empire at its Greatest Extent* (Fig. 117)

It remains to summarize the salient features of the remarkable extension of the empire which coincided with this long period of peace and prosperity in China Proper. The Manchus returned to the imperialist policy of the Han and the T'ang, and brought practically the whole of the interior steppeland, from different parts of which China had been so often menaced, under firm control. The empire reached its greatest extent, although no attempt was made to penetrate, as the Han generals had done two thousand years before, beyond the Pamir passes into the steppes and oases of western (now Russian) Turkestan. It is, indeed, sometimes said that under the Manchus the Chinese Empire reached its 'natural limits'. This is a notoriously dangerous phrase, but one of the implications doubtless is that the natural physical limit of Chinese political influence on the west and north-west is the outermost rampart of the mountain system of Central Asia, formed by the Pamirs and the Alps of Kashgaria, continued by the western Tien shan and—after the partial break of the Dzungarian depression—by the Altai and Sayan mountains. To these limits the Manchus did in fact approximately extend the empire. The degree of control, however, differed greatly in the various regions technically brought within it, and this has an important bearing on their present status in relation to the Republic of China.

(a) *Manchuria*.—This was always treated by the reigning dynasty as an imperial patrimony and, outside the historic scene of colonization in the south, Chinese emigration was severely restricted. This

virtual reservation of Manchuria was one of three principal ways in which the alien character of the dynasty was perpetuated, the other two being the enforced wearing by the Chinese of the Manchu

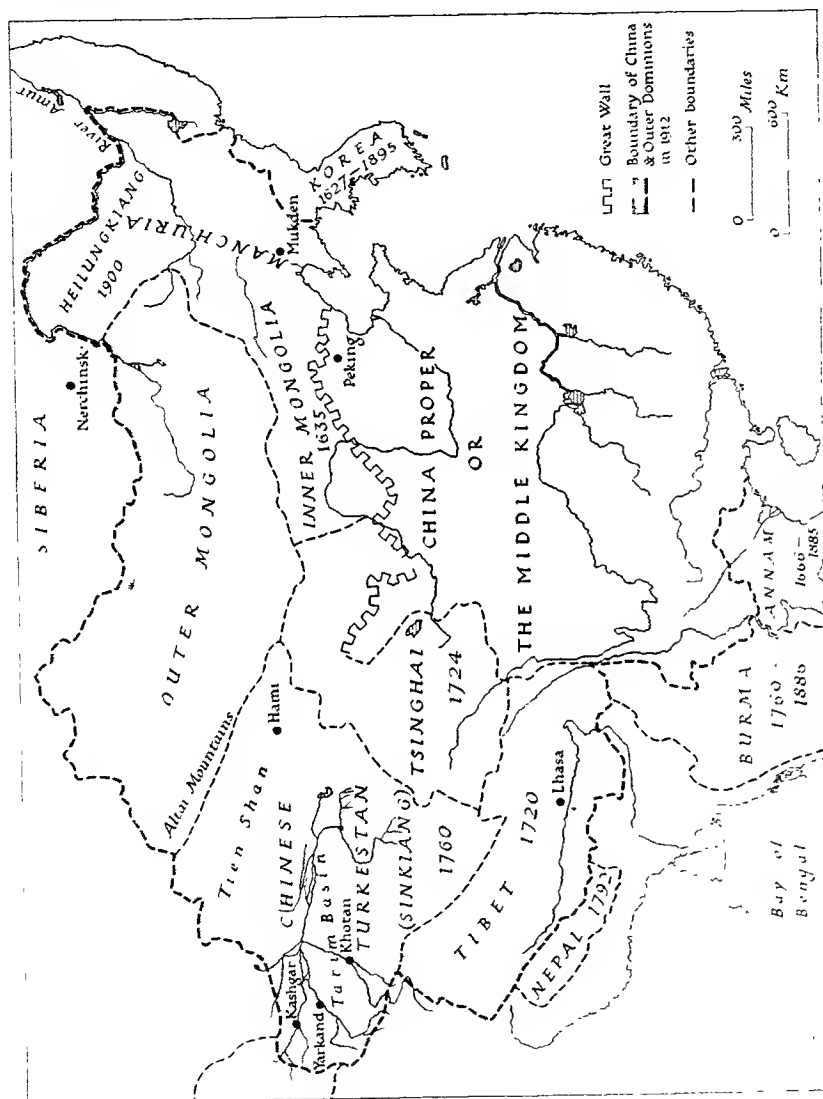


Fig. 117. The Ch'ing (Manchu) empire, A.D. 1644-1911  
Based on Hermann, A., *Historical and Commercial Atlas of China*, p. 61 (Cambridge, Mass., 1935).  
This map shows the reorganization and extension of the Chinese Empire under the Manchus; the dates given are those of the incorporation of the various territories. The map may be compared with Fig. 1, which shows the present position.

queue or 'pigtail'—regarded by the Chinese as a mark of servitude—and the garrisoning of Chinese towns by Manchu bannermen. These must to some extent qualify the generalization already made

that the Manchus identified themselves closely with Chinese interests. The garrisons in the towns were at first no doubt a necessity, but they gradually degenerated into idle and costly parasites. Moreover, they drained Manchuria of its original Manchu population, and this, in conjunction with the ban on Chinese immigration, resulted in the country being dangerously underpeopled in the nineteenth century, when the menace of Russian imperialism developed.

The eastward extension across Siberia of the Czar's empire did, indeed, cause trouble to the Manchus in the early stages of their power. Clashes occurred in the region of the Amur valley over the establishment of Russian colonies and trading posts. This difficulty, however, was settled in a statesmanlike way by the conclusion between the emperor K'ang Hsi and the Czar of the important Treaty of Nerchinsk in 1689, which determined the boundaries between the two empires—approximately the water-parting ranges of the Stanovoi mountains between the Amur and Lena river systems—and also provided for commercial relations between them. The treaty is remarkable as the first concluded between China and a European power and as one made between two sovereign states, ostensibly on equal terms. It might well have served as a model for later agreements between China and the western trading nations, and probably would have done so if a man of K'ang Hsi's capacity and width of outlook had been in control of China in the nineteenth century.

For 150 years after the Treaty of Nerchinsk there was no further trouble from Russia, whose activities in the Far Eastern sphere in the eighteenth century were mainly concentrated on the development of the fur trade in the far north.

(b) *Mongolia*.—Control of the Mongol world was a cardinal feature of the vigorous foreign policy of the early Manchus. The Mongols had completely lost the cohesion of their imperial era and were now divided into three main regional groups: the tribes of Inner Mongolia on the Chinese side of the desert of Gobi, those of Outer Mongolia on the farther side of the desert, who were known as the Khalkas, and a mixed western group, extending into Dzungaria and Turkestan, with the collective name of Kalmucks.

The first of these three regional groups had participated in the Manchu conquest of China and held a key position on the threshold of China Proper. The Manchu policy was to subsidize their princes, keep them under close supervision by means of the so-called

'banner' system, which restricted their range of movement, and treat them as a kind of buffer between China and the more formidable tribal groups of the outer circumference. At the same time Chinese merchants were actively encouraged to trade with them under permits and guarantees for safe-conduct and collection of debts, and from the tolls charged on this protected trade the imperial exchequer greatly profited. From this time onwards Inner Mongolia, including Jehol, was drawn more and more within the orbit of China Proper.

The chief challenge to Manchu supremacy came from the western or Kalmuck group, where a tribe known as the Eleuths (or Ölöts) were attempting to build up a second Mongol empire. It was based on the Altai region and the northern steppeland border of (Chinese) Turkestan, claimed suzerainty over Kashgar, and on religious grounds—lamaism (the northern form of Buddhism) being now common to the Mongols and Tibetans—intervened in the affairs of Tibet. Had this empire been consolidated, it would have controlled the critical routes across Central Asia so vital to China and constituted a new steppeland menace to the Middle Kingdom. The Manchu rulers met this danger with great skill. K'ang Hsi did not intervene until the Eleuths tried to force the Khalkas of Outer Mongolia to submit to their rule. When the Khalkas appealed for his protection his army drove back the Eleuths from their territory and occupied Hami, the key to Turkestan from the east. Henceforth, i.e. from the end of the seventeenth century, Outer Mongolia acknowledged the suzerainty of China, but, in contrast to Inner Mongolia, retained its own tribal organization and virtual autonomy. Indeed, it was rather the overlordship of the Manchu emperors than the suzerainty of China as such that the Khalkas admitted. Outer Mongolia revolted immediately after the fall of the Manchu dynasty in the Chinese Revolution of 1911-12. (For its present status see p. 8.)

(c) *Chinese Turkestan*.—K'ang Hsi did not directly follow up his victories over the Eleuths but turned to the affairs of Tibet. The task of recovering Central Asia for China was, however, very completely accomplished under his grandson, Ch'ien Lung. In 1757 his armies utterly routed the Eleuths, and this success was followed by the occupation of Kashgar, Yarkand, Khotan and all the strategic centres of the Tarim basin. Then was taken a step momentous for the future political geography of China. The whole of the Tarim basin, together with the Tien shan and the

Dzungarian depression—embracing the entire territory between Outer Mongolia on the north and Tibet and northernmost India on the south-west—was constituted as China's 'New Dominion' (Sinkiang). It was to be administered directly from China as an integral part of the Middle Kingdom, and, to strengthen the connection, soldier-colonists and Chinese farmers, mainly Moslems, from the north-western provinces were settled in the oases. Manchuria excepted, Sinkiang is for Modern China much the most significant part of what used to be called the Chinese Dependencies because, in spite of its mainly arid character, which must always restrict colonization, it holds the historic routes to the west.

(d) *Tibet*.—K'ang Hsi's intervention in Tibet marked a new departure in Chinese foreign policy. Unlike Manchuria and Mongolia, Tibet had seldom been a menace to China Proper, except for forays from the Koko nor region. The situation had changed as a result of the fierce controversies in the world of northern (lamaistic) Buddhism, which involved the Tibetans in the political aspirations of the western Mongols. These controversies turned on the struggle between the so-called 'Yellow sect', which represented a great reform movement within northern Buddhism, and the older, admittedly corrupt cult of the 'Red sect'. Since Tibet is a theocracy the strife inevitably assumed a political form. The two heads of the new 'Yellow sect' were the well-known Dalai Lama, with his seat at Lhasa, and the Panch'an Lama, of secondary but considerable importance. The holders of both offices were (and are) selected as supposed reincarnations of their predecessors, 'living Buddhas'. The search for the 'rightful' heir can easily become the subject of political intrigue. The Eleuths, as already mentioned, were trying to bring Tibet within the orbit of the empire which they were building up in Central Asia. Although originally adherents of the 'Red sect', their rulers supported the Dalai Lama and endeavoured to control the succession. It was a disputed succession which gave K'ang Hsi an opportunity of intervention. He supported one of the claimants, in opposition to the Mongol choice, and on his behalf his troops occupied Lhasa in 1720. From this time onwards China has claimed suzerainty over Tibet and has endeavoured to secure that the Dalai Lama selected should be favourable to her interests.

It will be clear from this brief account that the original motive for the establishment of Chinese authority over Tibet was to counter

the serious Mongol threat. But with the destruction of the Eleuth empire by Ch'ien Lung's armies later in the century and the settlement of Mongolia on the lines already described, the significance of Tibet to China changed character. From the late eighteenth century onwards it was rather as a buffer state against danger, real or supposed, from south of the Himalayas that importance was attached to Chinese overlordship of the Lhasa theocracy. In the first instance the threat came from the rising power of the Gurkhas of Nepal, who attacked Tibet from the south and plundered the headquarters of the Panch'an Lama. In a campaign which is always reckoned as one of the most brilliant achievements in the military annals of China, an army, promptly despatched by the emperor Ch'ien Lung, expelled them from Tibet, penetrated the Himalayan passes into Nepal, and forced the Gurkhas to acknowledge Chinese suzerainty which was thus extended to the borders of India (1792). In the nineteenth and early twentieth century Chinese claims in Tibet were destined to be a serious cause of friction with British India. The relationship of the Tibetans of the Lhasa kingdom, i.e. Outer Tibet (as distinct from the Sino-Tibetan borderland) depended, as did that of Outer Mongolia, upon the personal ascendancy and prestige of the Manchu line. Its fall in the Chinese Revolution of 1911-12 was in both cases the signal for revolt.

(e) *South-east Asia*.—To complete the picture of the vast extension of Chinese power under the Manchu emperors of the great era must be recorded the rather vague admission of its suzerainty by Burma and Annam. Chinese cultural influence in this region had always been greater than its political authority, and the boundaries, particularly in the Yunnan borderland, were very indeterminate. Burma had never before come definitely within the Chinese political orbit, but Annam had had much closer relations with it from the Han dynasty onwards and for limited periods had been included in the empire.

### *China on the Eve of European Challenge*

The outward façade of this empire had never been so imposing as it was at the end of the eighteenth century, when the aged emperor Ch'ien Lung received the mission which had been sent under Lord Macartney to request reasonable trade facilities for the English merchants in China. His oft-quoted reply—that 'the Celestial Empire possesses all things in prolific abundance and



lacks no product within its borders. There is therefore no need to import the manufactures of outside barbarians in exchange for our own products'—expressed no more than the truth. But this imposing façade concealed the growing weakness which the succeeding century was to reveal. In actual fact China Proper, the core of the empire, was nearer real stagnation and inertia than it had ever been before. Its privileged and complacent class of Confucian scholars administered a system which had become pedantic and lifeless. Creativeness and leadership had been discouraged too long and too effectively. The Manchu regime had already passed its zenith, and in the closing years of Ch'ien Lung's reign, when he himself was losing his vigour, occurred the first ominous symptoms of the unrest which, as a result of overpopulation and official corruption, rampant under his feeble successors, was soon to assume huge proportions. This real, although as yet concealed, decline of China coincided with the tremendous development of western power and ambition which the industrial revolution and the growth of applied science made possible. The stage was now set for the greatest shock and gravest crisis which the Middle Kingdom had ever experienced. They were destined to shake the whole fabric of this ancient civilization to its very foundations and threaten for a time to destroy it altogether, but in the end to release latent sources of energy and to evoke powers of recuperation and reconstruction, which are shaping the emergence of a new and perhaps even greater China.

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## Chapter XII

### THE HISTORIC CIVILIZATION\*

*Chinese Civilization in Modern Perspective* : Reciprocity of Influences between China and the Outside World ; Evolutionary Character of Chinese Civilization.

*Chinese Thought : Social and Political Philosophy* : Primitive Religion ; The Origins of Confucianism ; The Teaching of Confucius ; The Rival Schools of Philosophy : Moism, Taoism, Legalism ; Confucianism as the State System of China ; The Chinese Classics ; The Challenge of Buddhism ; The Sung Philosophers and the New Confucianism ; The Effects of the New Interpretation ; the Modern Revival of Confucianism.

*The Chinese Type of Society* : General Features ; The Family Republic ; The Village Community ; China's Debt to the Family System ; The Social Grades.

*Bibliographical Note.*

The China of today is at once very new and very old. Her greatest problem is essentially one of adaptation. As Dr Hu Shih, one of the most distinguished of her modern scholars, puts it : ' How shall we Chinese adapt ourselves to this new world which is, at first sight, so different from what we have so long regarded as our proper civilization ? We must rediscover a national heritage, with which to relate in an organic, not an artificial way, the systems of thought of modern Europe and America, so that we may build on this new foundation a culture which is our own and in which the new and the old shall be fused '.

Thus regarded, the ancient civilization is of far more than historic interest. It is the background against which the problems and aspirations of contemporary China must be studied, and the source of much that will be incorporated in the China of the future. It still permeates the thought and captivates the imagination of even the most ' modern ' of her sons and daughters.

### CHINESE CIVILIZATION IN MODERN PERSPECTIVE

The older Western view of Chinese civilization might be summarized somewhat as follows : that it was almost entirely *sui generis*, owing little to foreign influences, that it was always intensely

\* This chapter should be read in conjunction with the preceding account of the ancient history of China.

conservative, and that it culminated in the so-called 'Classical period' of the last few centuries before the Christian Era, afterwards becoming static or even retrogressive until rudely disturbed by the impact of European civilization upon it. More intimate knowledge is greatly modifying this conception.

#### RECIPROCITY OF INFLUENCES BETWEEN CHINA AND THE OUTSIDE WORLD

In the first place, the isolation of the old China and its independence of foreign cultures are now seen to have been much over-emphasized. It can be shown from a survey of the material aspects of the civilization that from remote antiquity China has received as well as given both products and inventions.

In the formative stages of Chinese economy, wheat (as noted in the preceding chapter) probably reached North China from Western Asia, while the rice-buffalo complex, on which the agricultural system of Central and South China depends, seems to have originated in India; and from the same country at a much later date (eighth century A.D.) came cotton, the most important of Chinese textile crops. The Han expeditions to Central Asia (see p. 323) brought back the vine, alfalfa, the Bactrian horse and Persian glass, while maize, yams and sweet potatoes were introduced from the New World in Ming times.

On the other side of the balance-sheet the West owes to historic China tea, several kinds of fruit, sericulture and porcelain. It is interesting to notice that the idea of applying glaze to native pottery, which resulted in porcelain, is said to have been first inspired by the Persian glass which the Han imported.

In common with other great agricultural civilizations, China early developed an interest in astronomy and mathematics. While much is still obscure, these clearly owed a good deal to Indian, West Asian and Greek sources, including the knowledge and use of such instruments as the gnomon. The first Chinese map drawn to scale was made in the third century A.D. on what seems to be definitely a Greek plan, while between the third and sixth centuries eight translations into Chinese of Indian works on astronomy and mathematics are known to have been made, and in the seventh appeared a comparative study of Chinese and Indian mathematics. The importance of the contribution of the early Jesuit Fathers, such as Matteo Ricci and Verbiest, to Chinese knowledge of mathematics has been emphasized in the previous chapter, and

the scientific accuracy which it induced is believed by modern Chinese savants to have been a factor in the remarkable development of philology and textual criticism which was the chief intellectual achievement of the scholars of early Ch'ing (Manchu) times, most of whom were also mathematicians.

Of the many distinctively Chinese inventions such as the compass, paper and printing, some reached the West, partly through the medium of the Arabs. Paper was invented early in the second century A.D. (Latter Han dynasty) by the use of the bark of the mulberry tree, hemp and rags. In the eighth century (T'ang dynasty) its use spread to Samarkand and thence to Western Asia and Europe. Of the long priority of the Chinese in the invention of printing—in full use and of great importance in T'ang times—there can be no question, but the extent to which it was responsible for the subsequent development of printing in Europe is still controversial. The countries which primarily benefited from Chinese inventiveness were naturally those that came within the direct influence of her culture such as Korea, Japan, Indo-China and Turkestan, but the debt of Iran and Mesopotamia was considerable, and thence Europe was indirectly affected.

Although several of the ingredients of the material civilization of China were originally derived from foreign sources, the power to assimilate them and give them native forms and expressions has always been a marked feature. Thus, while the technique of casting bronze is believed to have been derived from the West, the art motives usually associated with it and the uses to which it was put were characteristically Chinese. Still more is this generalization true of religious, philosophical and artistic influences from other regions and countries. In the long period from the Former Han to the end of the T'ang, and especially under the latter dynasty, these influences were considerable, and one of them, Buddhism, had profound and permanent results on Chinese thought and outlook after receiving an essentially Sinitic interpretation (Plates 120, 121).

Most of the contacts mentioned in the preceding paragraphs were indirect, and, although the factor of isolation has been frequently overstated, it certainly should not be underestimated in the appraisal of the characteristics and evolution of China's historic civilization prior to the modern period of intimate contact with the West. No civilization of the Old World was in less direct touch with the others. With India, the nearest scene of high

independent culture, the immense physical difficulties of the intervening terrain made any intimacy of contact impossible. Vast distances of semi-arid plateau and mountain country separated China from Persia, the nearest of the West Asian centres of comparable cultural calibre. The peoples of the immediately neighbouring lands were either at a much lower cultural level or had derived the essential elements of their civilization from China itself. In this sense China was indeed isolated, and it was inevitable that she should to some extent suffer from it. The position has been admirably put by Dr V. K. Ting: 'She (China) had no Athens or Alexandria to serve as a stimulant to imperial Rome. . . . The culture originally matured in the Yellow river valley had to serve as the cultural capital of the whole of Eastern Asia. Her greatest service to mankind has been the extension of her civilizing influence to the various races and tribes, finally uniting them into a harmonious whole'.\*

Many as have been the misunderstandings and, indeed, the tragedies arising from the impact of Western industrial civilization on the traditional agricultural civilization of China, it can hardly be doubted that the effect of this impact, by ending the isolation and allowing the ingress of new ideas, has been to remove shackles which custom had gradually placed on the Chinese intellect and to liberate the energies which are so conspicuous in the contemporary Chinese scene.

#### EVOLUTIONARY CHARACTER OF CHINESE CIVILIZATION

In spite of this isolation and the limitations which it imposed, the Western view of Chinese civilization (current in the nineteenth century and expressed in Tennyson's oft-quoted 'Better fifty years of Europe than a cycle of Cathay') that it was essentially static and immobile needs drastic revision. The civilization passed through many stages of development in most aspects of human endeavour, and the so-called 'Classical period', which in the West was long supposed to mark its apex, is now seen to represent a comparatively early, though very important, phase of evolution. With the exception of bronzes, nearly all the great achievements of Chinese art were subsequent to it. Porcelain, with humble beginnings in the Han dynasty, underwent a continuous series of developments through the Sung and the T'ang and culminated under the Mings and early

\* Ting, V. K., 'How China acquired her Civilization', in Zen, Sophia H. Chen (editor), *Symposium on Chinese Culture*, p. 10 (Shanghai, 1931).

Manchus, the process of using metallic oxides, put over the glaze to form polychrome designs in enamel, originating as late as the seventeenth century. Calligraphy, which the Chinese rank as one of the greatest of the arts, was continuously developed in a variety of forms, and the sister-art of painting perhaps reached its climax in the Sung and the T'ang, the masterpieces of landscape-painting which distinguished the latter reflecting the contemporary influences of Buddhist thought and art (Plates 122-7).

Literature, in particular, shows a long and intricate evolution. In the time of Confucius it was at a comparatively primitive stage of development. The collection of folk-songs, sacrificial odes and elegies known as the *Book of Odes*, which was then already in existence, broadly corresponds to the Homeric poems of early Greek literature. The sayings of Confucius himself and of his immediate disciples are recorded in *The Analects* in the form of disconnected aphorisms. Sustained and logical argument in prose follows later in the fourth and third centuries B.C., and the latter is particularly distinguished by the appearance of philosophical essays and dialogues. Not long afterwards, under the Han dynasty, the *Shih Chi* (Historical Records) of Ssü-ma Ch'ien inaugurated China's long and almost continuous series of scholarly historical works.

From 'classical' times onward the increased facilities for writing (notably ink in the form of lacquer, the invention of paper about A.D. 105, and of printing some centuries later) expanded both the output and the demand for literature. There is general agreement that the T'ang dynasty was the golden age of Chinese poetry, when romanticism, under the influence of Buddhism, was at its height. The 'Age of Reason' which succeeded it is associated with the mature work of the Sung thinkers, who gave Confucianism a new and definitely philosophical form. With the development in Yuan (Mongol) and Ming times of the drama and the novel, written in the vernacular, came the divergence between popular literature and the literature of the scholars which has already been noted (see p. 350). Thenceforward the former was the more spontaneous and creative, the work of the Ming and Ch'ing (Manchu) scholars being largely concerned with commentaries, interpretations, textual criticism and the compiling of immense encyclopædias. However, from the period of 'The Warring States', when feudalism was expiring, there was no age in which literary activity in one form or another was not conspicuous in China. So far from a single 'Classical period' embracing all its masterpieces, it is their wide

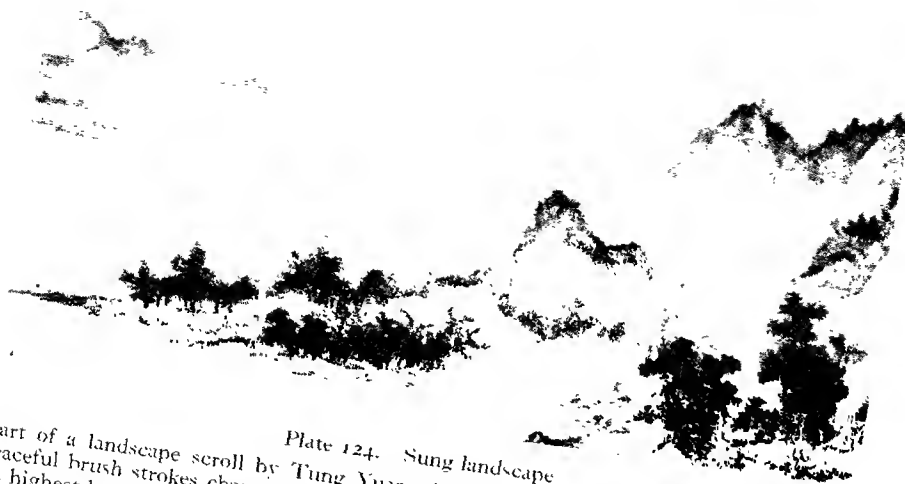


Plate 124. Sung landscape  
Part of a landscape scroll by Tung Yuan, Southern Sung school. Painted with the graceful brush strokes characteristic of this artist; Chinese landscape painting reached its highest level in this period

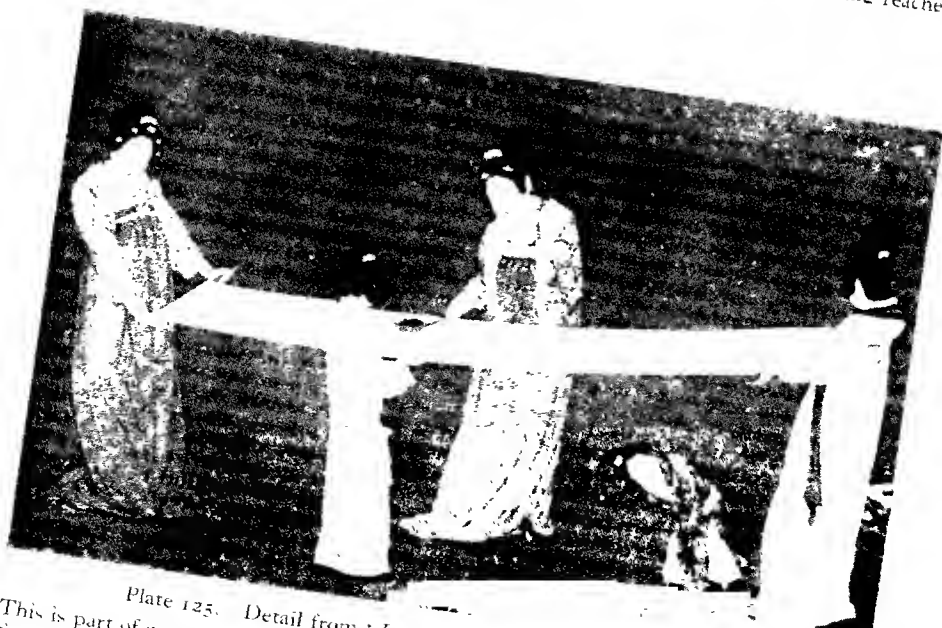


Plate 125. Detail from 'Ladies Beating and Preparing Silk'  
This is part of a game painting attributed to the artist-emperor Hui Tsung (1082-1135), Sung dynasty, and probably preserving a Tang design





Plate 126 Ming flower vase  
*C'houssoué* enamel on copper, with copper-gilt dragon.  
 Period of Wan Li (1573-1619). Height, 16½ in.



Plate 127 Porcelain vase, *famille verte*  
 Period of K'ang Hsi (1662-1722). Height, 23½ in.

range in time, aspect and form which is the outstanding feature and which can scarcely be matched in the literary history of any other civilization.

The evolutionary character of Chinese art, philosophy and literature is not equally matched by that of social and political institutions. These are more intimately connected with the economic structure of society, which in China underwent comparatively little change after the upheavals that destroyed the old feudal system, and substituted the bureaucratic regime established by the Ch'in and consolidated by the Han. It is indeed the relatively unchanging character of the structure of Chinese society that constitutes one of the most important contrasts with western Europe. But, even in this field, it is noteworthy that the elaborate and characteristically Chinese system by which the civil service in practically all its grades was recruited by state examinations in the classics (and sometimes in other subjects) was very gradually extended from small beginnings in the Han dynasty. To work it out completely, with many experiments, took more than 1200 years, and it was of course entirely subsequent to the 'Classical period'. The sweeping charge of stagnation and immobility which the West of Tennyson's time was accustomed to bring against the civilization of China cannot be upheld in the light of such a record. But, on a balanced view, it may well be contended that it had reached its zenith in the T'ang and Sung periods, and that an unhappy sequence of events—the Mongol devastations, the natural reaction to purely native traditions during the Ming recovery, the closing of the land routes to the west at the same period and, perhaps above all, the excessively conservative policy of the Manchus and their premium on rigid Confucian orthodoxy—had tended to strangle further progress in many directions. The circumstances in which Western and Chinese civilization came into contact and conflict in the nineteenth century were singularly unpropitious. It was mainly the acquisitive and materialistic side of the West—in the arrogant and aggressive mood which the consciousness of power given by the industrial revolution induced—that China then came to know. It was China in a weak and reactionary phase and misgoverned by a thoroughly decadent dynasty which the West encountered. Now that the superiority complex from which both civilizations have suffered at different periods has, as we may reasonably hope, been removed, there is a much brighter prospect of mutual respect, understanding and appreciation.

## CHINESE THOUGHT : SOCIAL AND POLITICAL PHILOSOPHY

The brilliant modern Chinese writer Lin Yutang has expressed the view that ' Chinese art alone will make any lasting contribution to the culture of the world ' and that ' Chinese philosophy, with its moderation, restraint and pacifism . . . can never suit the Western temperament with its aggressive exuberance and vitality '.\* However this may be, the attitude towards life and its problems of the world's largest national entity of over 400 million people must be a very big factor in the world's future, and the chief key to this attitude lies in the experience and teaching of more than 3,000 years of collective living.

During this long span of time the religious and philosophical ideas of the Chinese people have passed through different phases. There was first what may be called the era of primitive religion. Then came the vital and remarkable period of constructive thought from about the sixth to the third century B.C. which saw the rise of Confucianism and other important rival schools of philosophy, several of which had permanent results on Chinese mentality and outlook. This was succeeded in the Han dynasty (206 B.C.—A.D. 214) by the triumph of Confucianism and its adoption as the state system of China. After the time of the Han began the great challenge of Buddhism, much the most important foreign influence that historic China received. The challenge culminated during the T'ang dynasty (A.D. 620–907), and for some centuries China seemed likely to become a predominantly Buddhist country. Confucianism, however, although temporarily eclipsed, never ceased to be the official system and, with the decline of Buddhism, reasserted its hold in a different form. It received a new metaphysical interpretation by the philosophers of the Sung dynasty, especially by the great thinker Chu Hsi (A.D. 1130–1200), which gave it a different bias for many succeeding centuries. In our own time, however, there has been a revival which seeks to recapture its original inspiration.

These phases form the subject of the ensuing discussion.

### PRIMITIVE RELIGION

The primitive religion of the Chinese people, prior to the era of Confucius and the other sages of the ' Classical period ', has been

\* Lin Yutang, *My Country and My People*, p. 271 (London, 1935).

summarized by Dr Hu Shih as containing the following elements : ' (1) The worship of a Supreme God ; (2) The worship of the spirits of the dead ; (3) The worship of the forces of Nature (from among which *Tien* or Heaven, in all probability, was differentiated and developed into the Supreme God) ; (4) A belief in the idea of retribution of good and evil ; and (5) A very general belief in the efficacy of divination in various forms '.\*

These ideas and practices seem to have been derived in part from the older Shang peoples, with their strong belief in divination—as shown by the Anyang oracle bones (see p. 303)—and stress on ancestor worship, and in part from the incoming Chou people, to whom is ascribed the conception of Shang-ti (Supreme God) or Hao-tien (August Heaven) and that of the punishment of wrongdoing and the reward of virtue.

### THE ORIGINS OF CONFUCIANISM

Long before the time of Confucius a learned class had appeared, which was originally concerned with the composition of the written questions to the spirits and the deciphering of the marks on the oracle bones supposed to record their answers, and gradually this learned class became charged with a number of duties connected with the performance of state ritual and the details of administration. This was the origin of the scholar-official class which, as in most agricultural civilizations, was in the first instance a kind of embryo priesthood, but in China was destined to develop into something very distinctive and apart. Nearly all the feudal states employed such officials, and their influence in determining conceptions of government has been already noticed (see p. 311). Confucius† himself belonged to this *Ju* or official class in the small but important state of Lu (contained within the modern province of Shantung).

The age in which he lived was one in which Chinese society was rather rapidly outgrowing the tribal and feudal conceptions which had hitherto held it together. New and difficult questions of administration were appearing, and might be summed up as the problem of how to maintain social and political cohesion in a

\* Hu Shih, 'Religion and Philosophy in Chinese History', in Zen, Sophia H. Chen (editor), *Symposium on Chinese Culture*, p. 29 (Shanghai, 1931).

† His surname was *Kung*, which appears in the latinized form, by which he is called in the West, as *Conf.* The syllable *fu* has the meaning of 'great teacher'.

rapidly expanding society, where the authority of the (Chou) emperor had become purely nominal. Several of the poems in the *Book of Odes* reflect the bewilderment and unrest of the time. In the generations immediately following Confucius, this process of disintegration was greatly accentuated and culminated in the drastic remedy applied by Shih Hwang Ti of the Ch'in dynasty, who established the centralized bureaucratic empire which the Han retained but modified, and thereby made more acceptable to the people as a whole.

The problems of this transitional period of social and political confusion, covering the sixth to the third centuries B.C., sharpened men's minds and gave rise to a ferment of intellectual activity and controversy. It is important to note that Confucius himself lived in the earlier part of this period (551-479 B.C.) and that the system which bears his name was further developed both by his immediate disciples and later adherents, particularly Mencius\* (372-289 B.C.) and Hsün Tzū (298-238 B.C.) when rival philosophies and views of society were competing with it. The whole period is sometimes known as that of the 'Hundred Schools of Philosophy', and in actual fact there were at least five or six well-marked schools of thought, each with its distinctive point of view as to the right solution of the problems of which men were conscious. At this stage Confucianism had by no means triumphed but seemed rather to be fighting a losing battle. It was not until the Han dynasty was well established that Confucianism, in the reign of the Emperor Wu Ti (140-86 B.C.) was adopted as the official or state 'religion' and was sealed with the hall-mark of orthodoxy. By that time it had incorporated certain elements derived from some of the other schools of thought and had to be adjusted to conditions in many ways different from those prevailing in the lifetime of the sage.

### THE TEACHING OF CONFUCIUS

The substance of his teaching, although probably not in the actual words of Confucius, is undoubtedly contained in the book known as the *Lun Yü* or *Analects*,† which was put together two or three generations after his death on the basis of the oral transmission of

\* Chinese surname Mêng. The Latinized form Mencius means Master Mêng.

† See 'The Sayings of Confucius', a translation with introduction and notes by Lionel Giles in 'Wisdom of the East' series (London, 1907).

his sayings and conversations with the large group of disciples and pupils whom he gathered round him in his later years.\* The philosophy of Confucius was based, in the main, on conceptions and practices which had long been current among the Chinese. These he sought to clarify and, in a sense, to rationalize so as to give a coherent view of life and society and, in particular, to provide standards by which individual conduct would conduce to social well-being and stability. He disclaimed originality and appealed to what he conceived to be the noblest elements in the Chinese tradition. His system was essentially a code of social ethics, based on moral principles and constantly invoking the better instincts of human nature. There is repeated emphasis on *Jên*, 'the feeling in the heart', or, as we should say, conscience, as the natural source of right conduct.

The favourable view of human nature, implicit in the *Analects*, was stated more explicitly later by Mencius, who said that if men 'become evil it is not the fault of their natural powers', which include the sense or instinct of compassion and reverence and the capacity to distinguish truth from error. There is thus in the teaching of Confucius and his disciples a real feeling for the dignity of human nature, respect for personality and realization of its importance. The main concern, it is true, is with its expression in terms of social relationships, but these are not to be determined by 'taboos' of magical origin or 'commands' from a supernatural source. They must be the expression of the trained instincts of the human heart. All the rites and ceremonies on which he laid such stress—and some of his disciples even more—were conceived as external manifestations of an eternal principle of harmony. It is now generally agreed that the English word 'propriety', by which the constantly recurring Confucian term *Li* was formerly translated, very imperfectly expresses its real meaning and that, in Christopher Dawson's phrase, 'it signifies not a conventional correctness of behaviour but an interior conformity of the individual mind to the universal order which governs not only the life of society but the whole course of nature'.†

\* According to the accepted tradition Confucius, in his earlier years, held an important official post in the state of Lu, but resigned as a protest against the conduct of the reigning prince. He then wandered for several years through other Chinese states, trying to get his theories accepted as the basis of government, and eventually returned to Lu, where he concentrated on teaching.

† Dawson, C., 'Confucian Tradition', in *The Spirit of China*, p. 6 (London, 1942).

Running all through Confucian teaching at its best, forming, indeed, a certain bond between it and Taoism (see p. 380), which in most respects is sharply contrasted with it, and apparent also in many aspects of Chinese art, is this conception of a sublime natural order, of which man is a part and in conforming to which he finds his real happiness. The late Laurence Binyon, among the greatest of English interpreters of Chinese art, constantly stressed this theme as one of the most important clues to the understanding of Chinese painting and poetry. He writes, for example, that 'the thoughts underlying certain phases of Chinese art will seem peculiarly modern, especially the acceptance of man's true place in the vastness of the universe, the intuition of a continuity of life through all creation, the sympathy with every form of life outside humanity no less than within it'. He pointed out that Chinese art is more contemplative than that of Europe, and that 'landscape was valued above all other kinds of painting because it comprehended everything, man included. Man was not conceived of as the lord of creation, to whose services all other life ministered, but as one among countless orders of beings in the universe through which life continually streams. It seems that for the Chinese mind there was a sort of exultation in the consciousness of belonging to this eternal ever-changing stream of life'. To the Chinese artist the personality of birds, beasts, flowers and trees, their varying moods and phases of development, were just as significant as those of men. Human portraiture in fact was not at all conspicuous in Chinese painting. 'This refusal to centre interest in man and his works, this flowing out of the mind into all forms of life, is what makes the main contrast between Chinese and Western art'.\*

The social applications of this principle, as developed by Confucius, were naturally conditioned by the circumstances of his time and, to a large extent no doubt, by the bias of his own mind. He was in no sense a political innovator and does not seem to have anticipated any significant change in the structure of society. On the contrary he looked back to the supposed golden age of the sage-kings and the early princes of the Chou dynasty as providing the pattern of social conduct. This does not, however, invalidate the real significance of his teaching that it was man's supreme duty 'to act socially', and 'the five-fold relationship', in which it was chiefly expressed, was as applicable to succeeding ages as to his own.

\* The quotations in this paragraph are from Binyon, L., 'Painting and Calligraphy', in Ashton, Leigh (editor), *Chinese Art*, pp. 5, 6 (London, 1935).

The five-fold relationship concerned the reciprocal duties of (a) sovereign and subject, (b) father and son, (c) husband and wife, (d) elder brother and younger brother, (e) friend and friend. They were intended to cover all human relationships and, if three out of the five concern relationships within the family, that was because the family was regarded as the microcosm of society and the state as an extension of the family. The underlying principle is that 'when the family is orderly then the state is peaceful'. Lin Yutang has pointed out that the only Chinese word for society as such is a compound of the two words *Kuo* (state) *Chia* (family), i.e. state-family, and that in the *Hsiao Ching* (Book of Filial Piety) Confucius is made to say : 'The reason why the gentleman teaches filial piety is not because it is to be seen in the home and everyday life. He teaches filial piety in order that man may respect all those who are fathers in the world. He teaches brotherliness in the younger brother, in order that man may respect all those who are elder brothers in the world. He teaches the duty of the subject in order that man may respect all who are rulers in the world', and again : 'Those who love their parents dare not show hatred to others. Those who respect their parents dare not show rudeness to others'.\*

The emphasis laid by Confucius on the *reciprocal* character of duties and obligations in a well-ordered society is of great importance. Mencius elaborated the concept of the status of the sovereign, and clearly indicated that 'the mandate of heaven' by which he ruled could be 'exhausted' through a misuse of his position, in which case the people had the right and duty to rebel. In this way the concept of the imperial office in China was very different from that in Japan, where the emperor 'could do no wrong'.

In the teaching of Confucius himself and of his immediate followers who developed it, particularly in relation to ritual observance, there is no insistence on the authority of the state. Order and harmony in society are to be maintained by the force of example, from the emperor downwards, and by education. There is to be government by 'gentlemen', Confucius giving an idealized and ethical content to the term *chün tzü* by which the aristocrats of the feudal China were known. But more than 200 years after the master's death, Hsün Tzù (298-238 B.C.), often regarded as the most profound of all the thinkers of this school in the formative period, introduced a new element which had much influence in the formulation of Confucianism when, in Han times, it became the state religion.

\* Lin Yutang, *My Country and My People*, p. 171 (London, 1935).



By the time of Hsün Tzū the disintegration of the old feudal China was almost complete and the need of restoring order had become paramount. Equally with Confucius and Mencius did Hsün Tzū emphasize the moral order of the universe and the supreme importance of education in social behaviour, but he differed from them in maintaining that man's natural inclinations are evil and that right conduct must be achieved not only by training but also by the enforcement of justice. 'The nature of man', said Hsün Tzū, 'is evil; his goodness is only acquired training. The original nature of man today is to seek for gain; if this desire is followed, strife and rapacity result and courtesy dies . . . therefore the civilizing influence of teachers and laws, the guidance of the *Li* and of justice is absolutely necessary' (Plate 132).\*

#### THE RIVAL SCHOOLS OF PHILOSOPHY: MOISM, TAOISM, LEGALISM

In thus insisting on law and justice Hsün Tzū had much in common with one of the other 'schools' of thought whose rivalries make the intellectual history of China at this formative period of her development of such supreme interest, and a brief summary of the more important of them may be conveniently made at this stage.

At opposite poles of thought were two views which were not destined to make any permanent impress on Chinese life, although the influence of the second was very considerable for several centuries, and it is not without significance in the modern presentation of Christianity in China.

The one was the entirely cynical philosophy of Yang Chu (fourth century B.C.), who regarded life as futile and governed by fate and held up to ridicule the sage-kings, whom Confucius so revered, as men who, by spending their lives fruitlessly in the service of the state, had themselves never known a day of ease. The maxim 'Let us eat and drink for tomorrow we die' sufficiently summarizes his outlook.†

#### *Moism*

At the other extreme was Mo Ti (*circa* 500-420 B.C.), the founder of a system or, perhaps better, a religion, which bears his name

\* Hughes, E. R., *Chinese Philosophy in Classical Times*, p. 231 (London, 1942).

† Yang Chu is not usually credited with the establishment of a 'school' of philosophy, but the attention devoted to his views by Confucian and other opponents shows that they must have had a certain influence on his contemporaries.

and whose teaching is recorded in the *Mo Tzū Book* (see p. 388), somewhat comparable in character to *The Analects* of Confucius and the *Book of Mencius*. Undoubtedly Mo Ti is one of the outstanding figures in the history of Chinese thought, and the contrast of his outlook with that of Confucius is of deep and permanent interest. Confucius was above everything a humanist. He accepted ancestor worship as an essential part of the family system, which he regarded as of supreme social importance, and he took part in rites and ceremonies which had a semi-religious significance. But on the deeper spiritual issues his attitude was one of reverent agnosticism. His reply to a disciple is well known : ' We do not know life ; how can we know death ? We have not learned to serve man ; how can we serve the Gods and Spirits ? ' To Mo Ti all this was anathema. The central principle of his teaching was the existence of an all-loving God : ' The will of God is love—love for all and without distinction '.\* On this basis he sought to revive and purify the primitive religion, and he attacked the Confucianists for ignoring the spiritual significance of human life and for putting their trust in the regulation of family relationships. But with the fervour of a deep religious conviction Mo Ti combined a very logical and practical mind. The greater part of the book which bears his name consists of logical deductions from his main premise that man must exemplify the love of God. One was the wickedness of the aggressive wars which were such a prominent feature of his time—the period of ' The Warring States '. Mo Ti was a pacifist, but it is interesting to notice that he did not carry his pacifism to the point of non-resistance to aggression ; on the contrary he devoted what seem to have been considerable engineering talents to the construction of machines for the defence of cities and states which had been wrongfully attacked.

Another deduction was the sinfulness of extravagance in funerals and other family observances which wasted the real resources of the people for living decent lives. This was one of his main quarrels with Confucian teaching and, on the same grounds, he even denounced music and all the ceremonial connected with it, to which Confucius attached great significance. Mo Ti has been described as a religious utilitarian because he brought everything to the touchstone of human good, as he saw it. At the same time virtue was to

\* Quotations relating to Mo Ti in this section are from Hu Shih, ' Religion and Philosophy in Chinese History ', in Zen, Sophia H. Chen (editor), *Symposium on Chinese Culture*, p. 35 (Shanghai, 1931).

be its own reward. Mo Ti 'promised no heaven and threatened no hell'. His was a creed which made demands on human nature that the Confucians thought to be impracticable and incapable of attainment. Yet the best of them fully recognized his sincerity and greatness. Mencius was one of Mo Ti's chief critics but said of him: 'Mo Ti loved all men and was willing to wear out his body from head to heel for the benefit of mankind'.

In the hands of its later exponents Moism seems to have become primarily concerned with the elaboration of the system of logic which its founder applied, and to have lost its appeal to man's religious instincts. Not much is heard of it after the time of the 'First Emperor' (222-209 B.C.), but the sublimity of Mo Ti's creed and its anticipation by several centuries of some—by no means all—of the essential tenets of Christianity will always give it a very high place in the history of religious thought.

### *Taoism*

In contrast to Moism, the system which westerners know as 'Taoism' has endured through all the centuries side by side with Confucianism, and has been almost if not quite as essential a part of Chinese life and thought. Its beginnings perhaps ante-date those of Confucianism, for tradition makes its reputed founder Lao Tzŭ an elder contemporary of Confucius, who, according to a well-known story, once met and conversed with him. The Chinese themselves more frequently call the system Laoism after him. The name Taoism, which westerners use, comes from 'Tao' meaning 'The Way', the keynote word of Lao Tzŭ's philosophy. In folklore and traditional art Lao Tzŭ is one of the best-known figures in the whole story of China, but there is an increasing tendency to regard him as mythical or at any rate semi-legendary. However this may be, there is no doubt about the antiquity of the ideas accredited to him. The famous Taoist philosopher Chuang Tzŭ (*circa* 369-286 B.C.), from whose writings the best conception of the Taoist point of view may be obtained, was a contemporary of Mencius, and probably not much later appeared the *Tao Te Ching*, a kind of Taoist bible or textbook.

Taoism has so many aspects and has passed through so many different phases that it is difficult to give any real idea of its character in a short condensed statement. It has been a philosophy, with a distinct if somewhat elusive theory of government, and it has been and still is a religion, with an intricate and bewildering jumble of

tenets and practices. But above all it has stood for a certain outlook on life.

As a philosophy, Taoism, in its earlier and undoubtedly purer form, was essentially metaphysical and mystical. It stressed the pursuit of what western thinkers would call the Ultimate Reality or the Absolute, something to be attained by contemplation and the illumination of the soul, but not capable of apprehension by the physical senses. 'The Way', as used by Taoist thinkers such as Chuang Tzŭ, often seems equivalent to what we understand by the rhythm of nature. 'Follow the nature of things', said Chuang Chou, 'and admit no personal bias; then the world will be at peace'.\* It was thus a philosophy of naturalism, and, in its application to politics, it consistently advocated *laissez-faire* or 'masterly inactivity'. The Taoists have been called philosophical anarchists. Organization and regulation, they said, lead nowhere; the less people are governed and controlled, the better they will be. Education is a mistake, and so is all artificial civilization, particularly that of town and city life. To follow nature's way in rural surroundings is the true ideal of life.

All Chinese interpretations emphasize the point that Confucianism and Taoism appeal to two different sides of Chinese nature, and that Taoism provides a way of escape from the conventionality and rigidity of Confucian orthodoxy. As such, in spite of their contentions and rivalry in the field of ethics and politics, they have been to a large extent complementary, and it is possible to be both a Confucianist and a Taoist, although perhaps not simultaneously. As Lin Yutang humorously puts it: 'Every Chinese is a Confucianist when he is successful, and a Taoist when he is a failure', for then Taoism is 'a balm that soothes the wounded Chinese soul'.† Certainly it has always made a tremendous appeal to the romantic and eternally primitive instincts in man, and perhaps the chief difference between China and the West in this respect is that the Chinese have made no pretence of suppressing or educating them out of existence. At all stages of Chinese history the desire to escape from the conventions of official or town life to retirement in rural retreats, to mountains and temples in beautiful surroundings, has made a strong appeal to a large proportion of the educated Chinese, and the ideal of contemplation and detachment from the world of affairs has bulked much larger than in the West. Buddhism

\* Hughes, E. R., *Chinese Philosophy in Classical Times*, p. 198 (London, 1942).

† Lin Yutang, *My Country and My People*, p. 52 (London, 1935).

strengthened the tendency. Confucianism itself made a compromise with it, and the term *chüssü* denoted a Confucian scholar living in Buddhist retirement without becoming a monk.

This instinctive but conscious revolt against the sophistication and artificiality of over-civilization may well be a factor in the longevity of Chinese culture. It is as if the Chinese have always been aware that 'civilization', carried beyond a certain point, may easily undermine its own foundations. The attitude was at its height in the 'Age of Romanticism' of the T'ang dynasty, when Taoism, in conjunction with Buddhism which greatly influenced it, was undoubtedly the inspiration of the poetry and painting that make it one of the most creative eras in the whole history of China.

It was not only to scholars and officials that Taoism offered a way of escape. It has been this also for the rank and file of the people, although in a cruder form. It was easily capable of degenerating into superstition and, as time passed on, particularly after the Ch'in had introduced from their semi-barbarous homeland various occult practices and beliefs, it became increasingly associated with alchemy and magical rites. Unlike Confucianism, it gave rise to a priesthood, and it is principally the Taoist priests who have been called in to decide propitious sites and to determine lucky dates. To emperors, such as Shih Hwang Ti, anxious for immortality, the hopes these priests held out of discovering an elixir of life were irresistibly attractive. His instinct of statesmanship induced the Emperor Wu Ti of the Han dynasty to make Confucianism the official 'religion', but he himself and several of his successors were Taoists in their personal beliefs and inclinations.

### *Legalism*

The last of the really important and influential schools of thought, which challenged Confucianism in the crucial period of 'The Warring States', did so from an angle entirely different from that of the Taoists. Indeed its point of view was in many ways the antithesis of the Taoist position, and Confucianism can in this respect be regarded as 'The Middle Way' or mean between the two. The 'school' in question came to be known in the Han dynasty as the *Fa Chia* or Legalist school. Of several notable exponents of it the two outstanding names are those of Shang Yang (*d.* 338 B.C.) and Han Fei (*d.* 233 B.C.). The teaching of both men has been preserved—although with later accretions—in works

which bear their names : the *Book of the Lord Shang* (for Shang Yang attained a high position in the state of Ch'in) and the *Book of Han Fei*. As the latter contains the most mature and developed exposition of the doctrines of this school and the author was a writer and thinker of great distinction, the Chinese often describe the philosophy as Han-feism.

The Legalists were essentially authoritarian. Like the Confucian Hsün Tzū, of whom Han Fei in his early days was a disciple, they had no belief in the natural goodness of man, but whereas Hsün Tzū put his trust in training and moral persuasion as well as in judicial restraint, the Legalists relied only on the strict administration of law. The strength of a state, argued Han Fei, depends upon conformity to law. It was the strength of the state which was their real objective, and they were the totalitarians of their time. They emphasized the autocratic power of princes governing by a rigid code of laws, and Han Fei also stressed the importance of statecraft, somewhat in the fashion of Machiavelli in 'The Prince'. The strength of a state, they argued, was manifested in two ways : developed agriculture and capacity for war. To these objects everything else must be sacrificed. Music, poetry, history and ceremonial rites were distractions which should be ruthlessly swept away. 'A country whose strength has been consolidated is powerful but a country that loves talking is dismembered'. Appeals to tradition and to ancient codes of chivalry were ruled out. The interests of the family must be subordinated to those of the state : 'The love of parents is not sufficient to teach a son morality, but the severe punishments of the officials are needed. People become naturally spoiled by love, but obedient to severity'. But not only must the lives of the common people be completely at the disposal of the state ; all feudal privileges must be abolished. The authority of the prince must be absolute ; the law must control rich and poor alike. Such in brief was the teaching of the Legalists.

The great historical importance of this school is that the rulers of the Ch'in state adopted their views almost *in toto* and, by putting them into effect, gave the *coup de grâce* to feudalism within their own domain, eventually conquered all China and, for the time being, imposed upon it the same ruthless totalitarian regime. It was the Lord Shang who, as the chief minister of the Ch'in monarch of his time, laid the foundations of the 'new order' in Ch'in itself. Later Li Ssū, an immigrant scholar official from the rival state of Ch'u, acted in a similar capacity to the Ch'in ruler who became the

'First Emperor' and, under or with him,\* applied the same principles to the country as a whole. The salient features have been described in the historical chapter: the virtual suppression of feudalism, the reorganization of the country in 'provinces' under bureaucratic administration, the 'Burning of the Books', the proscription of the scholars, the great development of public works (canals, roads, irrigation, the Great Wall) by forced labour and the establishment of peasant holdings.

#### CONFUCIANISM AS THE STATE SYSTEM OF CHINA

China, however, was not to become a totalitarian state. The revulsion against Fascist methods was such that the memory of the 'First Emperor' is execrated to this day. Under some of the early Han emperors it was rather the Taoist policy of *laissez-faire* that prevailed, but under Wu Ti (140-86 B.C.) Confucianism, as already stated, was made the state system and so remained until the establishment of the Chinese Republic 2,000 years later. Yet the Legalists as a school of thought survived into the Han era, and they were not without influence on the form which Confucianism then assumed.

As officially established under the Han, Confucianism was to a large extent a compromise and included several elements derived from the other schools which had opposed it in pre-Ch'in times. There was a distinct flavour of Taoism in some of the occult practices which it now recognized in a more or less rationalized form. There was a more definite emphasis on the existence of spirits and the direct intervention of 'Heaven' in human affairs than Confucius himself had admitted, and in this the influence of Moism may be detected. The effect of Legalism was chiefly shown in the official status which Confucianism now came to enjoy. Henceforth it had a certain authority which the sage had never contemplated, and the Confucian scholar officials, who became the governing class, naturally stressed the importance of orthodoxy.

A distinction developed between the scholars and officials on the one hand and the rank and file of the people on the other. The former constituted an aristocracy of learning which gradually replaced the feudal aristocracy of the days before the 'First

\* The extent to which Li Ssü was responsible for the major changes is uncertain, but the 'First Emperor' undoubtedly retained the reins of power in his own hands.

Emperor'. For the enlightened, it was argued, there was no need of a rigid code of laws ; they would naturally regulate their conduct by the ethical principles which they professed, by all that was summed up in the Confucian *Li*. But the rank and file must be restrained by fear of punishment, and for them the penalties of misconduct were often grim and severe. From time to time, as under the T'ang and the Sung, criminal codes were devised, but for the most part it was left to the local magistrate 'to make the punishment fit the crime'.\*

This distinction between the privileged and the unprivileged was real enough, but in China it did not develop into the wide chasm characteristic of Czarist Russia and of many European countries in medieval and, indeed, in much later times. It did not destroy a certain democratic spirit which the Chinese have always displayed. For this several reasons may be assigned ; the absence of caste—for official positions were not hereditary—the strength of the family system, which tended to transcend or cut across distinctions of rank, the conception of village communities managing their own affairs, and, to a large extent also, the root-ideas of Confucianism itself, which exercised a certain restraining influence on the arbitrary exercise of authority. None the less the absence of an equitable legal code, applicable to all alike and administered by an independent judiciary, must be judged one of the principal defects of the historic Chinese civilization. The Confucian ideal of 'government by gentlemen' placed too great a strain on human nature.

Reverting to the official recognition of Confucianism under the Han, it should be noted that the composite form which it then assumed, with elements incorporated from the rival schools, brought to a single focus the various influences that had gone to the making of Chinese civilization in the earlier formative stages. The age of the Han was not one of the creative periods of Chinese thought, but this synthesis which it effected established Chinese culture on a permanent foundation. It was the Han scholars, who, so to speak, determined the content of the cultural heritage by editing and arranging the Confucian books which had escaped the Great Conflagration (213 B.C.) ordered by the 'First Emperor'. Many of these books, however, are very composite and portions of them undoubtedly originated in Han times. A thousand years later the philosopher of the Sung dynasty, who re-interpreted the Confucian

\* T'ai Tsu of the Sung dynasty decreed that all capital sentences must be passed to the throne for review.



doctrines in the sense which has since been considered orthodox (see p. 391), overhauled the work of the Han scholars, and the *corpus* of the Chinese classics, as then determined, may now be briefly summarized.

### THE CHINESE CLASSICS

The 'canonical' Confucian works, from the time of the Sung philosophers, have consisted of The Four Books (*Ssü Shu*) and The Five Classics (*Wu Ching*).

(A) *The Four Books* are :

1. The *Lun Yü* or *Analects*, consisting of the reputed sayings of Confucius and his immediate disciples.

2. *The Ta Hsüeh* or *The Great Learning*. The author of this work, to which the Sung critics (who rearranged it) attached great importance, is unknown but he was certainly of the Confucian school, and it is regarded as a kind of Confucian textbook. Much of it is devoted to refutation of the pernicious doctrines of Shang Yang (see p. 383).

3. The *Chung Yung* or *Doctrine of the Mean* (or, as a recent English interpreter prefers to translate it, ' *The Mean-in-Action* ').\* Tradition ascribes its authorship to Tzu Ssü, a grandson of Confucius. The Sung philosophers regarded it, along with ' *The Great Learning* ', as of outstanding importance, and it is generally agreed by modern critics that it presents the essentials of the Confucian system of thought and teaching.

4. The *Mêng Tzŭ Shu* or *Book of Mencius*, a record of his conversations, with probably later additions, and similar in scope and character to the *Analects* of Confucius. This emphasis on Mencius as of hardly less importance than Confucius in laying the foundations of the classical ethical system of China is noteworthy and accords also with the tendencies of modern Chinese interpretations.

(B) *The Five Classics* comprise :

1. The *I Ching* or *Book of Changes*. This is admittedly of very great antiquity, although appendices have been added by later Confucian scholars. It consists largely of omens in rhymed form, and has been extensively used as a kind of manual for divination purposes.

\* Hughes, E. R., *The Great Learning and the Mean-in-Action* (London, 1942).

2. The *Shu Ching* or *Book of History*, a collection of ancient historical documents and speeches. It has come down in two versions known respectively as the 'Old' and the 'New'; the former is reputed to have its source in a copy hidden in the wall of Confucius' house during the period of 'The Burning of the Books' and the chaos at the end of the Ch'in dynasty, when so much of the ancient literature was destroyed; the 'New' version is said to have been reconstructed by the Han compilers from the oral testimony of a venerable scholar, Fu Shêng, who had memorized the original text. Much controversy has raged over the degrees of authenticity and the relative age of its different parts, but some of the documents are of outstanding interest, particularly perhaps the tract known as 'The Tribute of Yü', which surveys the economic geography and regions of early China (see p. 302).

3. The *Shih Ching* or *Book of Poetry*, a collection of very ancient poems, hymns and songs, very valuable for the light they throw on the customs and beliefs of the feudal age in China. The anthology in its present form is attributed to the Han scholars.

4. The *Li Chi* or *Record of Rites*. This, together with a similar work known as the *Chou Li*, contains detailed accounts of the ceremonial ritual employed at the Chou court and in the feudal society of the time. The compilation of the *Li Chi* is attributed to the Han scholar, Tai Shen, at the close of the last century B.C.

5. The *Ch'un Ch'iu* or *Spring and Autumn Annals*, primarily a history of the state of Lu from 722 to 481 B.C. and traditionally ascribed to Confucius, a native of the country. There were probably similar annals of other states, and it may be broadly compared in scope and purpose with the English 'Anglo-Saxon Chronicle' which records the early history of Wessex. In form it is an arid statement of facts, but the accuracy of the dating is not questioned and it anticipates the meticulous care with which Chinese historians have treated the chronology of events. The *Ch'un Ch'iu* has given its name to a distinctive phase in the formative period of Chinese history (see Time Chart, p. 299).

Although not 'canonical' according to the criteria of the Sung philosophers, certain other Confucian works have hardly less renown and were indeed included in canonical lists of pre-Sung times. Such are the *Chou Li* or *Rites of Chou*, to which reference has been made above, the *I Li* or *Book of Etiquette*, and the famous *Hsiao Ching* or *Book of Filial Piety*, particularly important as a textbook of family obligations and ceremonial. Its authorship is ascribed to the Tseng

branch of the Confucian school and, in its present form, it is thought to be a revised version in mid-Han times of a work of the third century B.C.\*

### THE CHALLENGE OF BUDDHISM

In the long interval of more than a thousand years between the adoption of Confucianism as the state system under the Han, and the new interpretation of its fundamental tenets by the Sung philosophers, the thought and outlook of the Chinese were profoundly influenced by Buddhism.

The entry of Buddhism into China from India, its original home, by way of Central Asia and the Kansu corridor has been discussed in the preceding chapter. Beginning in the Han dynasty, its influence rapidly increased during the 'Age of Confusion' (third to sixth century A.D.) and culminated in the T'ang dynasty. In the sixth and seventh centuries of the Christian era China appears as a predominantly Buddhist country. Buddhist temples and monasteries covered the land; Buddhist rites and ceremonies were everywhere practised; the Buddhist priesthood acquired great prestige and honour. The native religion of Taoism, already described, copied its practices and adopted many of its tenets. The famous T'ang poets and artists largely derived their inspiration from its conceptions (Plate 133).

Buddhism, from an early date, had been divided into two strongly contrasted and opposed schools: the *Hinayana*, called in Chinese *Hsiao Shêng*, and the *Mahayana*, called in Chinese *Ta Shêng*. The former, which is certainly the nearer to the original teaching, is that still followed by the Buddhists of Ceylon, Burma and Siam—Southern Buddhism. It maintains that Gautama is the sole

\* It should be noted that the term 'Chinese classics' has here been limited to the recognized primary sources of Confucianism, which became the state system of China, and that there are a number of other important works, emanating from rival schools of thought, which, from a wider point of view, may be regarded as 'classical'. Several of them have been mentioned in the preceding discussion. They include the *Mo Tzu Book*, the *Tao Te Ching* and the *Chuang Tzu Book* of the Taoists, and the *Book of Lord Shang* and *Book of Han Fei* of the Legalists. Among other works of the Classical period may be mentioned the *Li Sao*, a celebrated poem attributed to the statesman Ch'ü Yüan, and the chronicle of feudal history known as the *Tso Chuan*. But rich as is the literary heritage of this formative phase of Chinese thought and standards, the losses in the Ch'in and immediate post-Ch'in periods were undoubtedly enormous. It has, indeed, been deduced from entries in the catalogue of the (Han) Imperial Library of 30 B.C. and from a thesaurus compiled in the Sung dynasty that more than three-fifths of the ancient literature of China has perished.

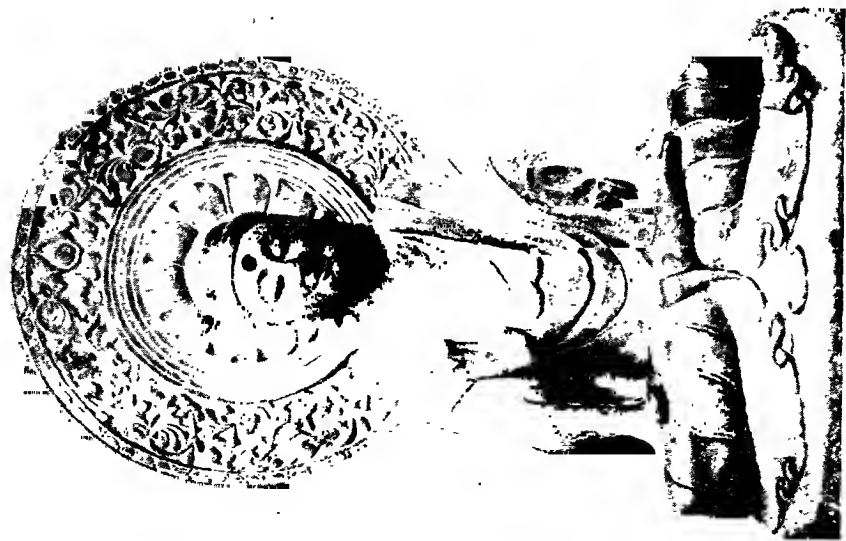


Plate 128. The *Amita* Buddha, in painted stone.  
Probably Sung dynasty. Height, 4 ft. 2 in.



Plate 129. Porcelain figure of *Kuan Yin* (Goddess of Mercy)  
Fukien ware, 17th-18th century. Height, 15½ in.

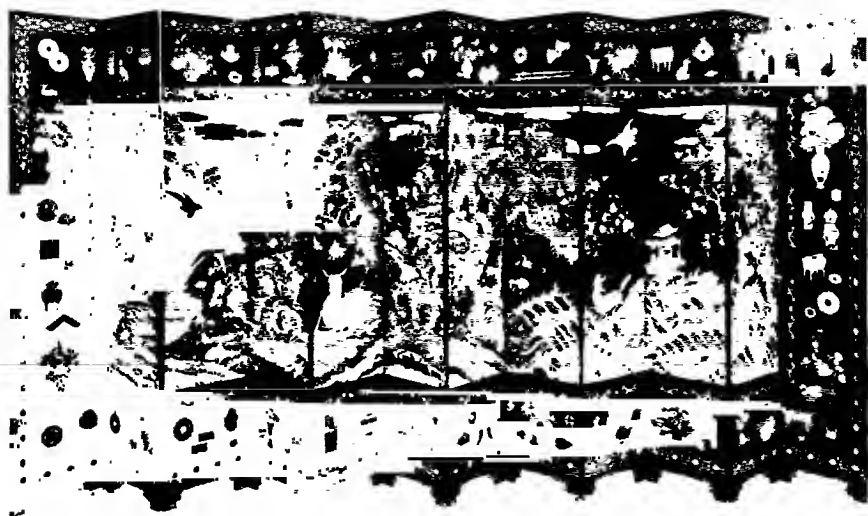


Plate 130. Twelve-fold screen

Incised lacquer, decorated in gold and colours on a black ground, 18th century Height, 8 ft. 10 in. ; length, 21 ft.

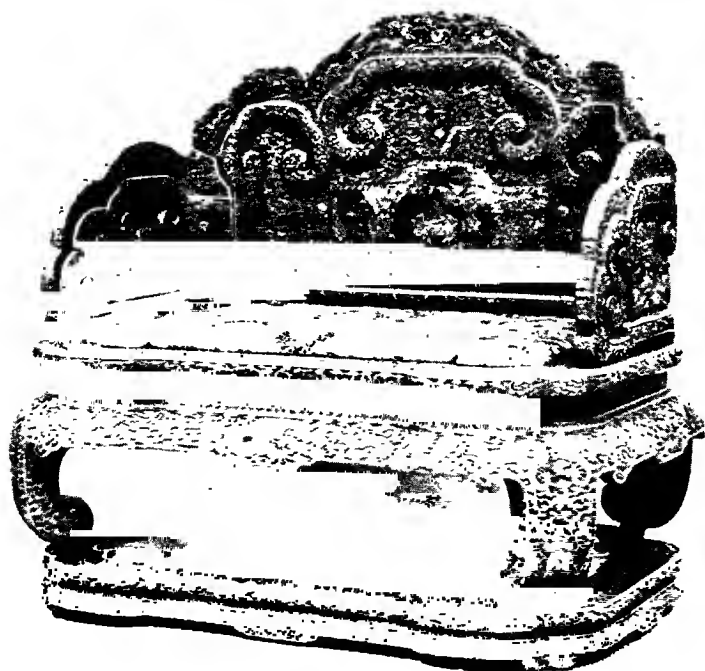


Plate 131. The throne of the emperor Ch'ien Lung

Carved red lacquer, middle 18th century Height, 3 ft 6 in. ; width, 4 ft 1½ in.

Buddha, and that he is not a god but a man who attained perfection, and that his supreme gift to men was the proclamation and illustration of the way of life by which alone they can attain *Nirvana*, the absence of striving and desire, and rid themselves of the *Karma* (sinfulness), which dooms them to repeated rebirths in a world of suffering and pain.

*Mahayana* has a much more complex content and a more positive teaching. It believes in many Buddhas, past, present and to come, who have the attributes of gods, and will listen to human prayers and require invocations and offerings; hence the importance of temples, ritual and a priesthood. Out of this school of Buddhism ultimately developed the conception of the divine *Amida* Buddha, as the coming saviour of mankind, with the promise of a paradise, very similar to the idea of Heaven in the West, to which man can aspire by the practice of benevolence and abstinence from evil.

It was this *Mahayana* form of Buddhism which principally affected Central and Eastern Asia, including China, and is sometimes known as Northern Buddhism, very different in its outlook from that of Burma and Siam. In China itself the cult of *Amida* Buddha gradually became predominant. It is symbolized in the well-known *Kuan Yin* or 'Goddess of Mercy', so often represented in Chinese art. Herself on the point of attaining Buddhahood, so the story runs, she turned back to listen to the cry of suffering humanity, and postponed her own blessedness until she could raise all mankind to her own level. Thus for the Chinese she stands for the principle of compassion (Plates 128, 129).

While this aspect of Buddhism had and still has a strong popular appeal, the more thoughtful minds developed its conceptions in forms consonant with the practical Chinese genius. More than one purely Chinese version or sect of Buddhism developed. Such, for example, was the *Lu Tsung* sect or school, which stressed the duty of purifying the heart and making actions sincere and the systematic practice of charity and benevolence—essentially Confucian principles in a new setting. The *Ch'an* school, on the other hand, which is better known in its Japanese form as the *Yen* sect, placed the chief emphasis on contemplation as the true way to enlightenment and so to Buddhahood, which in this way can be attained in man's present life, without need of reincarnation. Here it may be again emphasized that this idea of the importance of contemplation and of retirement to rural surroundings in order to practise it, has been and still is a very potent factor in the mentality of many

educated Chinese, and it is closely connected with the influence of Buddhism as well as with that of Taoism.

After the T'ang dynasty (A.D. 620-907) Buddhism in China began to decline. It was perhaps too negative in its attitude towards human life permanently to satisfy a people distinguished by their great zest for living and profound interest in problems of human relationships. Much of its teaching, especially its advocacy of celibacy, ran counter to deep-rooted Chinese conceptions, and even those emperors who were personally most influenced by it or by Taoism upheld Confucianism in the national interests. By the eleventh century both Buddhism and Taoism had spent their original force; the Chinese mind had reached its full maturity and was prepared to make a new synthesis in the light of the experience and insight which the challenge of Buddhism had given.

Yet Buddhism still remains a very important element in the life of China. The extent of its influence cannot be expressed in statistics or on distribution maps. It is essential to the understanding of China to realize that Confucianism, Taoism and Buddhism are not mutually exclusive and that they are often regarded, as a native saying puts it, as 'Three Ways to One Goal'. The same individual may be influenced by all of them in different aspects and phases of his life. The great number of Buddhist monasteries and shrines, however, still remaining in China is some indication of its significance. In Hangchow and its immediate neighbourhood—one of the chief Buddhist centres—there were nearly a thousand in 1930-1. The number, however, of professional Buddhists (i.e. monks and nuns) is believed to be less than a million.

#### THE SUNG PHILOSOPHERS AND THE NEW CONFUCIANISM

The restatement of Confucianism by the Sung philosophers is of fundamental importance because it has determined the main bias of Chinese thought almost down to our own time and is still significant in understanding the Chinese attitude to life. As a well-known authority put it twenty years ago: 'Present-day Confucianism, i.e. the system of ethical and metaphysical conceptions current in China for the last 700 years, is rather Chu Hsi's philosophy than that of Confucius'.\*

\* The quotations from Chu Hsi are from the translation of his work by J. Percy Bruce. See Chu Hsi, *The Philosophy of Human Nature* (translated by J. P. Bruce) (London, 1922), and Bruce, J. P., *Chu Hsi and His Masters* (London, 1923).

Although the system is thus fathered on Chu Hsi (A.D. 1130-1200) and is sometimes named after him, he was but the last, if probably the greatest, of a galaxy of outstanding thinkers who constitute the Sung school of philosophy. Their approach was very similar and, between them, they evolved the system which Chu Hsi expounded in finished form. Many of them he regarded as his 'Masters'. Intellectually it was perhaps China's greatest epoch, and it coincided, as did the formative period of Confucianism, with intense political unrest and controversy, centred in this case upon the inability of the Sung regime to stem the encroachment of the Kin Tartars. Chu Hsi was born just after the abandonment of Kaifêng as the imperial capital. It is a well-known semi-ironical Chinese saying that 'with the southern migration of the Sungs the revival of Philosophy began'. As illustrated by the present age, Chinese intellectual activity always seems to be stimulated by the threat of national disaster, and a conspicuous feature of the Chu Hsi period was the lively interest which the new teaching created. It was as much through the large 'schools' of disciples and students which the philosophers built up around them, as through their actual writings, that the new Confucianism took hold of the thought of the nation and ultimately became the standard of orthodoxy. Much of the teaching is contained, as in the case of Confucius and Mencius, in answers to questions put by students, but in a more orderly and systematic form, so that the whole appears as a sustained argument.

Chu Hsi and his predecessors were systematists whose purpose was to integrate and give logical form and philosophical validity to the ideas and precepts of the ancient sages. They interpreted these, however, in the light of their wider experience and perspective and, although they had come, after considerable mental struggle, to reject Buddhism and Taoism, they were undoubtedly influenced by them. 'While the springs of the Sung Philosophy', it has been said, 'are to be found in the classics, the stream was fed by affluents of widely different origin'. The philosophers placed their own values upon the received classical texts, which in some cases they rearranged, and singled out those, particularly *The Great Learning* and *Doctrine of the Mean*, which seemed to them to contain the core and substance of the faith of the early Confucians. Like them, their principal object in studying phenomena was to illuminate the place and purpose of man's life, but they endeavoured to give it a much more definite cosmic setting than the ancient sages had ever



attempted, and it was in this attempt, however unwittingly on their part, that the fateful shift of emphasis occurred.

### *Chu Hsi's Philosophy*

In Chu Hsi's philosophy the primary emphasis is on Reason. The unity of nature is, indeed, postulated throughout, and he attached great importance to 'investigating the nature of things', repudiating the view of the Ch'an school of Buddhism that understanding was wholly a matter of intuition and inner illumination. In actual fact, however, 'the investigation of the nature of things' took mainly the form of a search for co-ordinating principles by argument and dialectic. It did not result in China in that direct observation and experiment on which the natural philosophers of the West were to lay such stress a few centuries later, and it is noteworthy that this great renaissance of Chinese thought did not give rise to a scientific movement. It was content with a system of ethics and a theory of metaphysics. The dignity of Nature was proclaimed, but Reason remained the main guide to her interpretation.

The most significant part of this Sung system of philosophy is its insistence on the doctrine that 'Heaven is Law'. As elaborated by Chu Hsi, Law (*Li*) is the supreme guiding and regulating principle of the universe, directing and controlling the development of all being. 'Penetrating the universe', he writes, 'there is but one *Li* as the absolute reality, the pivot of creation and transformation, received alike by men and other creatures in all ages'. Moreover, it is 'absolutely pure' and 'perfectly good'.

Law is thus, in Chu Hsi's exposition, the ethical aspect of the universe, and when asked 'Where was *Li* before man came to be?' he replied: 'Even then it was here. It is like the water in the sea; whether you fill one bucket with it . . . or a single bowl, it is the same water from the sea. *Li* is the host, I am the guest. *Li* is eternal, whereas I receive *Li* but for a little while'.

Chu Hsi, however, recognized another principle in the universe which he calls *Ch'i*. This is usually rendered in English as Matter, although admittedly it does not express the whole meaning of the Chinese word. *Ch'i* is represented as filling all space and constituting the substance of physical existence. It is the material aspect of the universe, as opposed to the ethical aspect represented by *Li*. The two are always found together and are interdependent. *Ch'i* is the conditioning medium of human life and affects the manner in which *Li* is manifested.

Chu Hsi came to grips with the problem of evil and the inequalities of human endowment. Mencius, it will be remembered, had maintained the essential goodness of human nature, but other Confucians, notably Hsün Tzū, had contended that it was inherently evil. The explanation given by Chu Hsi has been considered by subsequent generations as the orthodox Confucian view of this long debated question. He made a clear-cut distinction between the 'original and essential nature' of man and his 'physical nature', i.e. the essential nature as conditioned by the physical medium of its manifestation. The essential nature, he maintains, is good and it was this which Mencius perceived, but the material conditions (*Ch'i*) affecting the reception of the *Li* may make it appear evil.

Against the fatalism apparently implicit in this conception, Chu Hsi argued with vigour. Nature, he urges, although capable of defilement by the conditioning medium, remains itself incorrupt. A pearl remains a pearl even when tarnished by muddy water. The water itself is pure even when conditioning circumstances make it turbid. 'To make manifest illustrious virtue is to cleanse the pearl from muddy water'.

Chu Hsi contends that this cleansing, although difficult, is possible, and that it is man's function to strive to achieve it. 'The object of self-culture is to transform the endowment' which the *Ch'i* has conditioned. Heaven has conferred on men 'a moral sense' and it is this which they must use to realize the goodness which is their real and true nature. But, except that this 'moral sense' is *conferred* upon them, there is no external redemption. 'When men have sought the conversion of the physical element in their constitution, their success in that conversion and their return to their original nature are not imparted from without'. Man has within himself the means of his own redemption.

Chu Hsi thus asserts the supremacy of moral law. In the relations of *Li* and *Ch'i* he expressly says that '*Li* is the ultimate ruler', and the apparent dualism of the universe is resolved in an *Absolute* or *Great Ultimate*, a first cause, which is virtually equated with an active principle of eternal righteousness. Chu Hsi's philosophy has often been represented as materialistic, but it is profoundly ethical. The moral concepts which the ancient sages had taught the Chinese people to regard as the true basis of society were strongly reaffirmed. As against the Buddhists, life is presented as essentially worth while, and, as against the Taoists, *Tao*, i.e. 'The Way' is proclaimed to be, not some mysterious

abstraction, but, in Chu Hsi's own words, 'the natural Law of Right which we find in the phenomena of the Universe'. He lays great stress on the supreme virtues which reflect the manifestation of *Li* in men, on righteousness, reverence, wisdom and sincerity, but above all, on *Jên*.

Of this quality *Jên*, one of China's greatest modern scholars, Liang Ch'i-ch'ao, has said: 'The root of all Confucian ethical and political thought is *Jên*. Without comprehending the meaning of this word, no understanding of Confucian philosophy is possible'.\* The significance attached to it in modern China is shown by the fact that the Chinese troops proceeding to Burma in 1942 were given as a slogan: 'If you cannot succeed, achieve the state of *Jên*; if you can achieve *Jên* you can be said to have succeeded'.† *Jên* in this case has been rendered as willingness 'to sacrifice one's life for a just cause'. Chu Hsi insists that *Jên* is the pivot and source of all the other virtues. It implies an active spirit of altruism and approaches closely to 'Love' as used in St. Paul's Epistles and the Fourth Gospel. It seems ironical that a philosophy which attaches such fundamental importance to this concept should have been interpreted as materialistic.

It is also commonly maintained that Chu Hsi's teaching was atheistic. He certainly rules out ruthlessly anthropomorphic conceptions which had crept into traditional Confucianism, but in some passages of his works he seems to affirm divine personality. In the most famous of these, after quoting from the Classics, he says: 'These passages indicate that there is a man, *as it were*, ruling in it all'. His theism, however, is certainly shadowy, and for all practical purposes he treats Heaven as simply the equivalent of Moral Law.

#### THE EFFECTS OF THE NEW INTERPRETATION

The consequences of the Neo-Confucian philosophy were certainly very different from those which its exponents had intended. In the attempt to build a consistent and, as they believed, an intellectually satisfactory system out of the rather fragmentary utterances of the ancient sages, they had shifted the emphasis from simple and direct teaching on personal relationships to more

\* Liang Ch'i-ch'ao (translated by Chen, L. T.), *History of Chinese Political Thought during the Early Tsin*, p. 218 (London, 1930).

† Yeh, George K. C., *The Confucian Conception of Jên*, p. 5 (London, 1943).



Plate 132. Tomb of Confucius, Kufow, Shantung

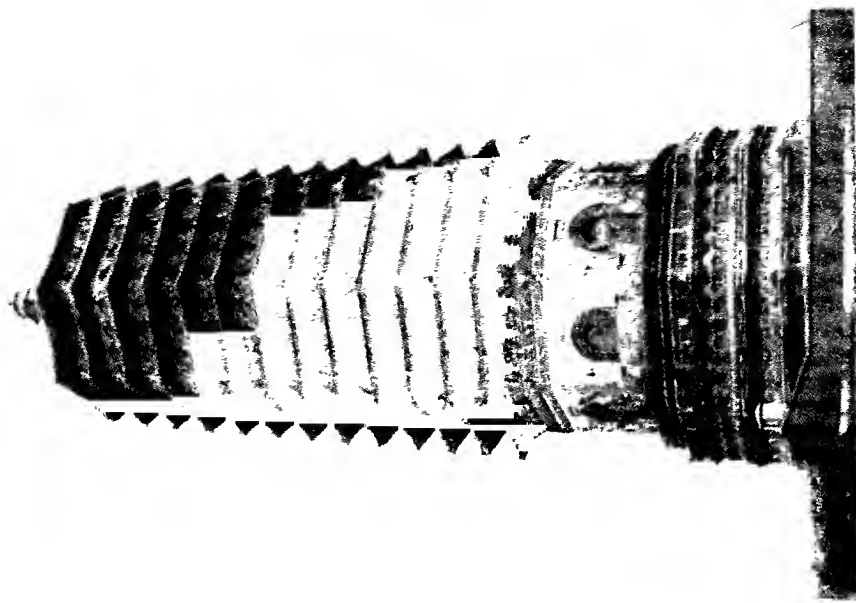


Plate 133. Pagoda at P'ohchuan near Peiping.  
Yuan dynasty, 13th century. Pagodas were at first closely  
associated with Buddhism.



Plate 134. Entrance to the Ming tombs at Chungpingchow, Hopeh  
An example of a *Pai-lou* or memorial gateway. These free-standing gateways are usually constructed of wood with three or more openings and mark the entrance to a sacred or beautiful spot or commemorate some event or person.



Plate 135. Temple in the Western hills near Peiping

abstract considerations of logical and correct thinking. In the actual event, whatever their own position, Heaven became an impersonal abstraction, and the incentive to vigorous action was greatly weakened. The mass of the people was not directly influenced, but the effect on the educated classes was undoubtedly serious. Instead of being an active dynamic force, Confucianism among the *literati* of the later dynasties, and particularly under the Manchus, tended to become arid, soulless and formal, the sterile dogma of a privileged class, who used it to maintain their own position through an examination system that became increasingly pedantic and absurd. There was a marked growth of scepticism and of cynicism in public affairs. The result upon the social and political life of China, at a time when active and disinterested leadership from this class was essential to meet the new dangers with which the country was confronted, was disastrous. Other factors contributed to the weakening of *morale* in these last centuries of the Old China, but the loss of the real spirit of Confucianism was probably the most potent cause.

#### THE MODERN REVIVAL OF CONFUCIANISM

In the important revival of Confucianism in contemporary China great efforts are being made to recover its ancient power and to get back its root ideas. Its fundamental conception of *Jên*, in the sense of willingness to co-operate and make sacrifices, is being invoked, as we have seen, to hearten the Chinese armies and also to underpin the vital movements for mass education and co-operative industry. Not least has one of the noblest of its conceptions, the ideal of leadership by scholar-administrators, nurtured in the philosophy of humanism, been revived and clearly demonstrated. The great traditions which bear the name of Confucius, although in fact they had their origin long before his time, are still a living force in China and have thus been admirably summarized by a recent English writer : ' The faith in the power of a great leader to exercise a transforming influence upon his people ; the doctrine that the sole end of government is the welfare of the people and that the Ruler has been entrusted with a Mandate of Heaven for that purpose alone ; the belief that government should be founded, not upon rights but upon obligations, not upon law and the compulsion of superior force but upon the sense of moral obligation implanted by nature in every human heart ; the theory that this moral sense is

the characteristic attribute of man and that, if it is sustained by instruction and example, men will without compulsion carry out the reciprocal obligations of the social order'.\*

## THE CHINESE TYPE OF SOCIETY

### GENERAL FEATURES

While the influence of ideas and of great teachers is one of the chief keys to the understanding of China's historic civilization, some of its most important features are related to the very distinctive and, indeed, unique type of society which produced it, and many of the social problems of modern China are a direct inheritance from the old regime.

In the introductory section of this chapter it was pointed out that in many respects, e.g. in art and literature, Chinese civilization has passed through as many different phases of development as that of Europe but that, in strong contrast to Western Europe, the social structure remained almost unchanged down to very recent times. Especially is this true of China's far-famed family system.

In the beginnings of nearly all societies, except those of a primitive hunting type, the family is the recognized social unit, and importance is attached to filial devotion and reverence for ancestors. In most pastoral societies, where nomadic movement makes the organization of government on a territorial basis impossible, these personal relationships naturally continue to be the basis of community life. China is unique in that they so continued in a vast and complex agricultural and commercial society which reached a very high level of civilization, with all the complications which that implies. For this outstanding feature of Chinese development two principal reasons may be assigned :

(a) The supreme influence of Confucian teaching at the critical stage when China was passing out of the primitive feudal stage. Confucius, as we have seen, thought of the family as the microcosm of the state and of the well-being of the state as dependent on family obligations being well understood and practised. His disciples and followers carried the idea even farther, and the *Book of Filial Piety* became the recognized textbook of social morality. Thus Confucianism gave the family system a new binding power and invested it with a religious sanction. The strong reaction against the totalitarian conception of the state which Shih Hwang Ti, the self-styled

\* Pratt, Sir John, *War and Politics in China*, p. 267 (London, 1943).

'First Emperor', tried to enforce in the third century B.C. did but strengthen the Confucian teaching, and from the Han dynasty onwards the cult of the family was practically unchallenged. The patriarchal idea was projected into the celestial sphere; the emperor was 'the Father' of his people and himself 'the Son of Heaven', ruling by its mandate and responsible to it.

(b) The absence of any strong incentive, until quite modern times, to form a closely-knit nationality where the claims of the state bulk larger than those of the family. Self-conscious nationalism of this kind comes by way of contrast with rival and often antagonistic nationalities, and within the purview of the Chinese none such existed. The world was China, the Middle Kingdom, with an outer fringe of 'barbarians'. There was always the consciousness of belonging to a 'Great Society'. The distinction between Chinese and 'barbarian' was clear enough, but China was so vast and all-embracing that for practical purposes the horizons of most Chinese were bounded by their own localities and their family or rather their clan groups.

The Old China was essentially a huge aggregation of virtually self-governing communities. The nominally absolute Empire was in fact made up of small republics, managing their own affairs—on the whole peacefully and happily—with a minimum of interference by the imperial authorities. There was the republic of the clan-family and the republic of the village. In some cases, especially in South China, where villages were not infrequently exclusively composed of different branches of the same family and bore such names as *Wang chatsuan* (the Wang village), the two coincided. More commonly they overlapped.

### THE FAMILY REPUBLIC

In discussing the family republic, although the past tense will be mainly used, the general outlines of the picture to be given still hold good for most parts of the country, notwithstanding the important modifications which western ideas, modernization, and the new conception of the state have introduced.

The concept of the family was that of an undying corporation, or rather of a living organism possessing a spirit quite apart from the individuals composing it. To perpetuate it was the prime consideration of all its members. The begetting of male posterity to carry it on was an absolute duty. If legitimate male children were lacking, resort was had to adoption or (in the case of well-to-do



families) to concubinage. The spirits of the ancestors were considered as an essential part of the family and their needs had to be served. 'Serve the dead', said Confucius, 'as if they were living'. And again: 'Attend to the coming generation and remember the remote ancestors'.

The memorial temple known as the *Ancestral Hall* was (and is) the most sacred place in the life of the clan, its spiritual home. Here were the ancestral tablets to which, with elaborate ceremonial, all members of the clan must present themselves to pay their respects to the common ancestors at various festivals, such as the anniversaries of the birthdays and deathdays of the deceased. Within the clan the constituent family groups had (and have) their own minor ancestral 'halls', even though, in the case of the poorest, they might be no more than an alcove or corner of a small room. Twice a year the members visited the hardly less sacred ancestral graves, grouped in tree-planted mounds amid the family fields in the open country.

Usually a proportion of the cultivated land belonged to the clan and was administered from the ancestral hall, where also the rules and customs regulating the duties and rights of the various members were posted up. The clan funds were often considerable, and a part of the income derived from its property was periodically divided according to a recognized procedure. Benefits of the type of old age pensions, grants to widows and free education of children were paid out of such funds, and not infrequently a promising boy of humble origin was thereby enabled to pass the state examinations, which qualified him for holding public office. In such cases the clan not unnaturally expected to enjoy the interest on the capital expended on him, and his *yamen* might be thronged with 'his sisters and his cousins and his aunts!'

In general, most of the functions which we associate with social services, such as provision for old age and unemployment relief, were discharged by the clan organization, and relatively few Chinese felt themselves stranded or completely destitute. In striking contrast to most western societies, the older a person became the more secure was his or her position. In no country in the world was old age more honoured and respected.

The management of the ancestral hall and its property was conducted on what has been described as 'a combination of hereditary and democratic principles'. Usually twelve executive members were annually elected and, in the case of unanimous election, service was virtually compulsory.

Within each constituent family group the rights and obligations of every member were determined with a precision probably never equalled. The authority of the father was theoretically supreme, but in practice the exercise of control and power of choice lay largely with the mother. It was she who chiefly administered internal affairs, while her husband managed the farm and performed the ancestral rites. The status of women in the Old China was far higher than in Japan or in most parts of India. In their own homes and villages their power and influence were very great and, apart from all-round skill in every branch of domestic economy, they were often well acquainted with the literature and history of their country from readers and itinerant minstrels even when they could not read or write. From the junior members of the family the highest loyalty was due to parents, and filial devotion was the greatest of all virtues. But loyalty to brethren came a high second and, in the words of a popular Chinese proverb, 'brothers are like hands and feet'. The family was indeed a closely woven fabric of clearly understood relationships. Marriage was essentially a contract between two family groups and was sometimes arranged through the mediation of a third party. Exogamy was strictly enforced. The relations between two families brought into connection by marriage were closely determined by custom. The bride's primary obligations were to her husband and her husband's family, and her happiness largely depended upon her relations with her mother-in-law. But her connections with her own family were by no means severed, and her husband incurred definite obligations to her parents. He became their 'half son', responsible, under pressure of public opinion, for their support, should they be left without male children of their own and in destitution.

### THE VILLAGE COMMUNITY

The other 'republic' was the village community, of which there are many hundreds of thousands in China. The average village was composed of several family groups, and the control of their relationship in a common community life was the function of local self-government, which was carried on for thousands of years almost independently of the imperial bureaucratic system. The lowest official in the imperial hierarchy was the magistrate of the *hsien*, the basic unit of administration. On an average it was about the size of a small English county and contained several hundreds

of villages. The *hsien* magistrate was often called 'the father and mother' official, because he was brought into closer touch than his superiors with the everyday life of the people, but, even in his case, the contact was but slight in normal times. The village effectively governed itself.

What the ancestral hall has been to the republic of the clan-family, the village temple has been to the republic of the self-governing village. The term temple suggests religious observances, and such are indeed practised in it. It is open for prayers and thanksgivings, and it is often dedicated to a deified mortal. It is rarely associated with a particular religious faith. Confucians, Taoists and Buddhists may all use it, and *Lao-tien-ye*, 'the Lord of Heaven', is sometimes invoked. But its chief function has been as a community centre, and it corresponds more to a small English town hall than to a church. Here were transacted the affairs of the village, some administrative, such as the maintenance of roads and canals and the provision of a simple kind of police system in the form of watch-duty, and some judicial, such as the settlement of disputes and the trial of petty crimes, the more serious being reserved, in theory at any rate, for the imperial authorities. It also regulated the relations of the village with its neighbours and with strangers, arranged the conditions under which markets were held, and provided the annual patronal festival, which was the great fête day of the village year, with dramatic performances as its central feature.

The village temple, like the ancestral hall, owned a considerable amount of land, which was let to tenants. The funds so derived were used to maintain the community services just mentioned, and to some extent supplemented the benefits provided by the ancestral halls. Its executive control was vested in a body in part consisting of permanent 'counsellors'—prominent local *literati* and elders—and in part of annually elected officers. The latter were heads of the different families in the village, who usually held office in some kind of rotation. The relations between these two elements are said to have been, on the whole, very good, the funds to have been scrupulously administered and the accounts strictly kept.

Although the village temple and its management was a purely voluntary affair, representing the aptitude and spontaneous desire of the people for self-government, the imperial authorities in practice recognized it as discharging essential and important duties, and held

the permanent officers of the temple responsible for the maintenance of peace and the collection and payment of the land tax.

In the larger towns and cities, which for the most part were only overgrown villages, administration was naturally more complex and official control more direct, but there, too, the system of mutual responsibility, based in part upon family units and in part upon neighbourhood, and functioning through elected headmen, formed the essential machinery through which the magistrates worked.

China was also always distinguished by its professional and voluntary associations for different purposes: by merchant and craft guilds (with an elaborate system of apprenticeship), which bear many resemblances to those of medieval Europe, by provincial guilds for members of the same province residing outside it, and by clubs among the *literati* to stimulate the discussion of literary subjects and the composition of poetry.

#### CHINA'S DEBT TO THE FAMILY SYSTEM

The family system, however, remained the bedrock of society. To it must be mainly ascribed the remarkable social stability which, through the many periods of political weakness and sometimes of anarchy, maintained the essentials of civilization and guaranteed China's unfailing power of recuperation and recovery from disaster, whether due to flood and famine, to internal mis-rule or invasion by the nomads. The family system, too, with its heavy but unchallenged demands on individual self-sacrifice in the interests of the group as a whole, has developed the outstanding capacity of the Chinese for reasonable give-and-take and so for collective living. In his discussion of the characteristic Chinese quality of patience, Lin Yutang recalls the native saying that 'a man who cannot tolerate small ills can never accomplish great things' and goes on to remark: 'The training school for developing this virtue is, however, the big family, where a large number of daughters-in-law, brothers-in-law, fathers and sons learn this virtue by trying to endure one another. In the big family, where a closed door is an offence, and where there is very little elbow room for the individuals, one learns by necessity and by parental instruction from early childhood the need for mutual toleration and adjustments in human relationships. The deep, slow, everyday wearing effects on character can scarcely be over-estimated.'\*

\* Lin Yutang, *My Country and My People*, p. 45 (London, 1935).

The extent to which the family system has suppressed individual initiative is a subject of controversy among the Chinese themselves. Undoubtedly it has severely limited freedom of action and enforced conformity to custom. On the other hand, as a part of the development of altruism, there was a distinct incentive to exertion and self-culture in the interests of the family. A well-known passage in *The Great Learning*, after laying it down that 'the tranquillity and happiness of the world depends on rightly governed states. A rightly governed state necessitates well-regulated families', proceeds, 'A well-regulated family is made possible only by the self-culture of the individuals composing it'.

A more serious charge is that the interests of the family were frequently preferred to those of the state. The Confucian sages certainly did not intend that they should be, as the passage just quoted from *The Great Learning* indicates. But in practice they often were, and, to Chinese public opinion as a whole, the cheating of the state for the sake of the family was far from being considered reprehensible. Individual mandarins might, and did, maintain a high standard of probity in public affairs and, even in the worst periods, vigorous protests and memorials to the throne against the misuse of public funds were never lacking, but it remains true that nepotism and favouritism were essentially characteristic of imperial China. The pressure of their families was such that relatively few highly placed mandarins had the courage to resist it. Herein lies the chief explanation of the contrast between the proverbial honesty of the Chinese in commercial transactions and also their efficiency in local government—which in both cases was enforced by watchful public opinion—and the prevalence of corruption in the national sphere, which was tolerated unless it assumed outrageous proportions.

The weakness in the body politic which this caused became a serious menace to China when, in the nineteenth century, she lost the immunity which isolation had hitherto given her, and became involved in complex international relationships. A new scale of values, in which family and sectional interests are subordinate to those of the state, became a necessity and is the avowed aim of the Generalissimo and other leaders of public opinion in contemporary China. How to reduce the excessive claims of the family, without impairing the firm foundations which it has always provided for Chinese society and the many fundamental virtues that it has inculcated, is one of the problems which the New China has to face.



Plate 136. Pavilion in the Imperial City, Peiping

In the Imperial City there are three lakes or 'seas' surrounded by many fine examples of Chinese architecture.

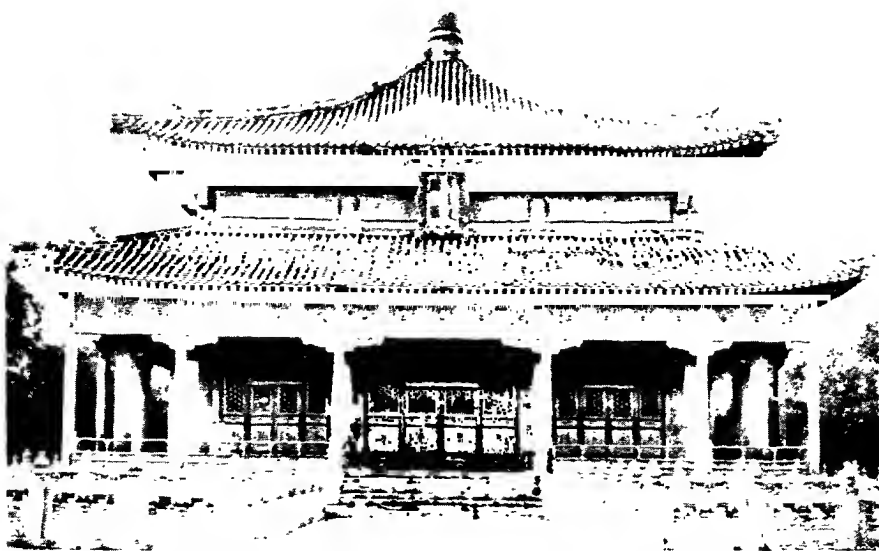


Plate 137. The Hall of Classics at the Confucius Temple, Peiping

The upturned line of the roof corners suggests aspiration. The tent form is sometimes regarded as the possible origin of the characteristic shape of Chinese roofs.



Plate 138. Buddha's Perfume Tower, Summer Palace, Peiping

The *Fo Hsiang Ko*, overlooking the lake by the Summer Palace, was built in the 19th century and is characteristic of the larger type of pavilion.

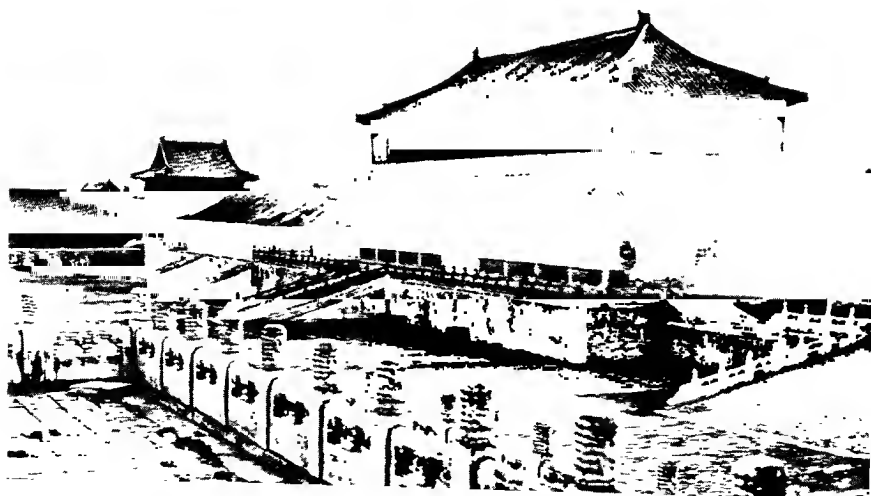


Plate 139 Pavilion in the Forbidden City, Peiping

## THE SOCIAL GRADES

It is not only in the predominance of the family system that the Chinese type of society, as manifested in the historic civilization, is of supreme interest. Quite as distinctive was the social grading, the relative importance of different classes in the community. The Old China was pre-eminently a great agricultural society and, as such, might be expected to exhibit the same type of social structure as other great traditional agricultural societies in, for example, India, the Middle East and Eastern Europe. In fact it exhibited several unique features.

Agricultural societies of the traditional type have been normally characterized by the following social grouping :—

- (1) The peasantry, the most numerous and basic class.
- (2) The craftsmen, linked up with the village communities and performing specialized functions within them.
- (3) The merchants, more often engaged on local trade than in large-scale and hazardous undertakings which have given great power and influence to this class in societies of the maritime commercial type, such as those of Venice or the Netherlands.
- (4) A territorial nobility, which has generally been feudal in character.
- (5) A learned class, essential to the requirements of an agricultural society and usually identical with the priesthood.
- (6) The king, expressing the unity of the whole organization and working through
- (7) A bureaucracy.

The history of many such societies is full of the conflict for power between (4) and (5) and between both of these and (6) and (7).

The outstanding feature of Chinese society from the Han dynasty (206 B.C.—A.D. 214) onwards is that a single class, the Confucian scholar bureaucrats, took the place or combined the functions of (4), (5) and (7). How this came about has been, to some extent, explained in this and the preceding chapter. With the early evolution of writing, which played so dominant a role in moulding the characteristics of Chinese civilization, there developed a very influential class of scholar officials. In its origins it performed ritual functions characteristic of an embryo priesthood, and later, under the Empire, the mandarins had to perform some quasi-religious duties, such as that of praying for rain in times of drought. But Confucianism was



not, in the strict sense, a religion at all and had no priesthood. The learned class in China was therefore essentially secular. After the overthrow of the feudal regime and the organization of an imperial bureaucracy under the Ch'in and the Han, the official recognition of Confucianism by the latter dynasty and the inauguration of the system of recruiting the civil service by state examinations in the Chinese classics, the power of this scholar class was almost unchallenged. The only recognized aristocracy was this aristocracy of learning, and in this respect, too, China was unique. For 2,000 years these scholar officials were the real rulers of the country. They could not transmit their offices to their sons. They did not form a caste, and the absence of caste was another distinguishing feature of China. But the profits and perquisites of office enabled them to acquire land, always the objective of well-to-do Chinese. They were the landed gentry of the Chinese countryside, and almost every district contained *literati* families, which habitually trained their most promising sons for the civil service. Their traditions and relative wealth gave them a definite advantage, although they often lost their vitality and the 'big house' passed to other owners.

### *The Scholar Officials*

These scholar bureaucrats of Old China were a most interesting and, in some respects, a unique social type. Their Confucian background gave them a very real heritage of culture. They were much better educated than the contemporary landed gentry of Europe, whether the feudal knights of medieval times or the English squirearchy of the eighteenth century. From their ranks came the famous writers and artists of China. They were not a warrior class like the medieval knights of Europe or the *Samurai* of Japan. They were not, on the whole, a very wealthy class like the Russian nobility. Although, as just noticed, they tended to acquire land, estates of more than 300 acres were rare, and serious encroachment on peasant holdings was intensely resented. The Confucian code, even though it lacked a spiritual dynamic to make it completely effective, was not without its influence in restraining the arbitrary use of power. In a broad historical view they may be said to have used their privileged status with some moderation. Yet when all this has been said, their dual position as landowners receiving rent, and officials collecting taxes, was a constant temptation to abuse, and, when imperial control was relaxed, there was much corruption and oppression of the peasantry.

*The Peasant Farmers*

The peasant farmers and their families constituted the vast majority of the population. Their relations to the class just described, and the degree of their prosperity or suffering, formed China's social barometer.

The actual status of the Chinese peasants was in many respects better than that of peasants in most European countries prior to the nineteenth century. They ceased to be serfs more than 2,000 years ago, when the Empire replaced the feudal principalities and the system of individual holdings was established. They were liable to compulsory civil labour and to military service for some centuries longer, but by the time of the great T'ang dynasty (sixth to ninth century A.D.) these had been commuted and taxation substituted. The land-tax, when fairly administered, was essentially light. Many, probably most, had some land of their own. But, in spite of all this, the historical records of China reveal the almost habitual poverty of the peasants, although its extent and degree varied greatly at different periods.

The causes of this historic mass poverty were undoubtedly complex. Natural calamities of drought and flood, which in many parts of China are liable to occur on a colossal scale, made their contribution to it. In part it was due to the excessive concentration of farms on certain types of land (alluvial plains and basins) suited to the particular agricultural technique which had been elaborated at a very early period and became stereotyped. In part—and this was probably the most potent reason—it was the result of the accepted social ethic about large families, which always tended to make population press on the means of subsistence. But agrarian abuse, extortionate (and illegal) taxation by unscrupulous officials and ruthless land aggrandisement of the type illustrated in the story of Naboth's vineyard, was an important contributory cause. Of the exceptional distress in periods of weak or corrupt imperial rule, such as those of the later Ming and later Manchu dynasties, it was a major cause. Every new dynasty tried to justify itself and win popular support by sweeping away these abuses and redistributing land which had been wrongfully appropriated.

In the nineteenth and early twentieth centuries the position of the peasantry rapidly deteriorated and the agrarian problem, which provides the chief fuel for the 'communist' movement, was accentuated by the increasing commercialization of agriculture, due to western contacts, and by the decline of the Confucian standards

which had held it in check. The modern aspects of this agrarian problem and its suggested solutions need separate discussion, but here it must be stressed that it is a legacy of the old regime.

In spite of the eternal struggle between haves and have nots, the Old China was freer than most countries from what we now know as the class war. Society, as a whole, was democratic in spirit, and the family system cut across and tended to level sharp class distinctions. There were, however, four well-recognized social grades, in this order of esteem: scholars, farmers, craftsmen, merchants. It was contrary to Confucian principles to recognize the profession of a soldier as honourable, although in fact wars were far from infrequent.

In the China of today the traditional view has been modified by the pressure of events. The soldier has risen greatly in popular esteem in the long and bitter struggle against Japan. The frequent cases of rice hoarding and profiteering have lowered the standing of the merchant class as a whole. But the scholar retains his primacy of place, and the student class, widely different as it is in training, equipment and outlook, inherits much of the prestige of the old *literati*. The new China maintains the ancient belief in moral values and the things of the mind and spirit of man.

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## Chapter XIII

### THE PEOPLES OF CHINA PROPER

*Introduction : The Use of the term 'Chinese'.*

#### I. THE CHINESE

*Constituent Elements :* The Mongoloid Type ; Non-Mongoloid Types.

*Physical Traits of the Modern Chinese.*

*Origins of the Chinese People :* The Early Chinese ; The Effects of the Tartar Invasions ; The Effects of the Southward Movement of the Historical Chinese.

*Regional Contrasts :* Contrasts between Northern and Southern China ; Regional Diversity in South China.

*Religious Communities :* The Chinese Moslems ; The Jews in China ; The Chinese Christians.

#### II. THE ABORIGINAL TRIBES OF SOUTHERN CHINA

*Reasons for Complexity.*

*Classification :* Linguistic Grouping ; Racial Aspects ; Cultural Aspects.

*Bibliographical Note.*

#### INTRODUCTION : THE USE OF THE TERM ' CHINESE '

China Proper, as defined in the introductory chapter, is a sub-continent with over 400 million inhabitants, approximately one-fifth of the human race. On general grounds we should therefore expect to find a great diversity of peoples within it. At the same time we are accustomed to think of the Chinese as relatively homogeneous and as the largest single human group in the world. This conception is perfectly sound if we think of it as implying unity of culture and civilization and the use of the same written language. It is in this cultural sense that the term 'Chinese' has always had its true meaning, and to it must now be added a new feeling of national self-consciousness. This does not necessarily imply any unity of 'race' as expressed in physical characteristics. Chinese civilization, in its progressive outward movement from its original nucleus in the Hwang ho basin which has been going on for some 4,000 years, has absorbed many tribes of different racial origins. It transcends these differences just as it transcends great differences of geographical environment. The process still continues. New recruits for the Chinese army among the aboriginal tribes in the south-west usually

declare themselves by their tribal or village names, but within a few months, when they have learnt to speak Chinese and have begun to adopt Chinese customs, frequently ask to be officially recorded as 'Chinese'.

In modern China, however, the distinction is still important between the Chinese in the full sense and the aboriginal tribes who live within the borders of the Republic but are not yet assimilated. The following discussion is based on this distinction.

## I. THE CHINESE

### CONSTITUENT ELEMENTS

Racially the Chinese are by no means homogeneous, but they do not exhibit the sharp distinctions of racial type which are found in India and Europe, and there is a general impression of variations on a single theme. The most conspicuous and dominant, although not the only, element in their composition is the so-called 'Mongolian' or 'Mongoloid'. This type, as the name implies, had its area of characterization in the plateaux of east-central Asia,\* whence it has drifted from very early times into the eastern and south-eastern parts of the continent.

#### *The Mongoloid Type*

The characteristics of this type are very well marked. They seem to represent an adaptation to the atmospheric conditions of a very distinctive environment, but to have been preserved with little change in regions of a quite different climate.

The Central Asian plateaux have an intensely dry climate, with bright sunshine in summer but with a very cold and prolonged winter and strong desiccating winds. It is believed that the human skin under these circumstances has been modified to resist the loss of body heat. The layers of the skin are thick and dry and the blood-vessels are deeply sunk. It is this which gives the parchment-like skin with its yellow tinge which particularly distinguishes the 'Mongolian' type of man. So too the hair pores are restricted, firm and round, and out of them the hair grows straight and almost cylindrical in section, the antithesis of the woolly hair of the Negroid type growing out of loose pores. The Mongolian type of skin-colour

\* This must not, however, be taken to imply that the modern Mongols of Mongolia are a pure race type. There is evidence of considerable diversities amongst them.

and the straight hair thus both seem to be related to climatic circumstances. The hair is almost invariably black and rather coarse. Body hair is very weakly developed. Accompanying these features there is usually a marked insinking of the nasal chambers, so that the general appearance of the Mongolian face is flat, which is accentuated by high cheek-bones, the result of strong lateral growth. The nose is generally small and mesorrhine, i.e. intermediate between the wide nostrils of the Negroid type and the narrow nostrils of the Nordic type of north-west Europe. The Mongoloid head is distinctly broad (brachycephalic\*), but, unlike the broad-headed type of Armenia, Anatolia and the Balkans, it is not high, and the skull tends to be globular in form.

Another marked tendency, but by no means an invariable characteristic, is the development of the so-called 'Mongolian eye'. This is really a combination of two features. First the fissure of the eye is frequently oblique, the outer being higher than the inner angle, thus giving the eye-slit a slanting character. The other is a fold of the skin, called the epicanthic fold, which covers the inner angle of the eye and may extend on to the cheek. In extreme cases the fold may sag down over the whole upper eyelid so as almost to conceal the eyelashes. Chinese artists have singled out these features and often deliberately over-emphasized them.

In general the Mongolian type is of medium stature ( $63\frac{1}{2}$ – $66\frac{1}{2}$  in.), but there is considerable variation according to food supply and other circumstances of the environment.

Such are the general characteristics of the Mongolian type which from early times has drifted eastwards into China and south-eastwards into Indo-China. The earlier waves may more properly be called proto-Mongol, exhibiting the features which have been described in a less developed and specialized form than the later waves.

### *Non-Mongoloid Types*

There are, however, clear indications in China and north-eastern Asia generally of another type which has now to a large extent blended with the Mongolian, but which is sometimes found, in

\* The cephalic index shows the proportion of the breadth to the length of the head as a percentage. Indices below 75 represent a long narrow head, termed dolichocephalic; those above 80 indicate a broad head, termed brachycephalic, and between 75 and 80 a medium or mesocephalic head. Something under two units are deducted from the cephalic index, measured on the living head, in order to get an approximation to the corresponding index, called the cranial index, measured on the skull.

individuals and even in regional groups, as clearly distinct from it. These often exhibit medium and long-headedness, with much less developed cheek-bones and with little of the characteristic yellow tinge of the Mongoloids; the oblique eye-slit and epicanthic fold are absent. More rarely, the hair is of the wavy type characteristic of Europe, brown rather than black, and, in these cases, there is usually body hair as well. (No considerable group in China, however, is known to possess the exceptionally abundant hair of head and body which distinguishes 'the hairy Ainu', the aborigines of Japan.) To this type it is convenient to give the name *Palæasiatic* and it is believed to have been far more widely distributed before the full development and outward spread of the stronger Mongoloid type, which has pushed it back to the more inaccessible regions and particularly towards the inhospitable north-eastern extremity of Asia.\*

In China the Mongoloid and non-Mongoloid features are often found in a great variety of combinations, and it is best to think of the Chinese as, on the whole, a mixed Mongoloid people which has absorbed considerable elements from groups, usually older established, belonging to other stocks.

#### PHYSICAL TRAITS OF THE MODERN CHINESE

(a) The greatest departure in China from the standard Mongolian type is in head-form. The Chinese as a whole, particularly in the north, are mesocephalic rather than brachycephalic. The data derived from scientific measurements are insufficient to allow of accurate generalizations. Various sample measurements, however, have been made, and the following results of such measurements collected by Professor Li Chi, a leading Chinese anthropologist, may perhaps indicate the general proportions of the different types :

<i>From Measurement of Skulls</i>		<i>From Measurement of the Living</i>
Long-heads	.. 19%	14·41%
Medium-head	.. 45·35%	42·12%
Broad-heads	.. 35·65%	43·47%†

This seems to indicate that the brachycephalic type is increasing but is not predominant.

\* This Palæasiatic type is found in North China. In the south, however, especially among some of the aboriginal tribes, there is found a type known as the Nesiots which, although probably of different origin, presents somewhat similar contrasts to the Mongoloid. (See p. 430.)

† Li Chi, *The Formation of the Chinese People*, p. 35 (Cambridge, Mass., 1928).

(b) Straight, black, coarse hair is overwhelmingly predominant and is probably the most unvarying characteristic. A name for themselves long used by the Chinese is that of 'the black-haired race'. Body hair is absent or inconspicuous, and, although beards and moustaches are sometimes grown by the older men, they are usually scanty.

(c) The yellow tinge in the skin is nearly always present but varies from pale olive yellow in the north among people who lead sedentary lives to deep yellow brown in the south among coolies and peasants exposed to strong sun glare. Pigment on the whole increases with decreasing latitude. The yellow tinge itself is rather the result of the blood-vessels being deeply sunk than of the actual deposition of pigment. The protection of the nerve-endings by the thick dry layers of skin has been thought to be a factor in the relative insensitiveness of the Chinese to physical pain and discomfort.

(d) The nose is insunk, small and usually inconspicuous. Measurements indicate that the mesorrhine type greatly predominates.

(e) The 'Mongoloid eye', with the characteristics noted above, is common but by no means invariable.

(f) The average stature of the Chinese has been estimated as about 1,652 mm. (65 in.), which is medium and closely approximates to what is believed to be the world average. There is, however, great regional variation and, on the whole, the northern Chinese are distinctly taller than the southern.

The narrowness and slenderness of the hands and feet is a well-marked trait and the suppleness of Chinese fingers is proverbial. The custom, long in vogue but now becoming extinct, of binding the feet of women was probably due to the desire to accentuate the characteristically small and admired 'lily feet'.

The general physique of the Chinese, given reasonably good living conditions, is sound and their vitality and power of recuperation are outstanding. Particularly in the north the struggle for survival under hard conditions during several millennia has produced a physically 'selected' type. Chinese have an extraordinary capacity to thrive in almost any climate, though whether the same physical type is involved in all cases is very doubtful.

#### ORIGINS OF THE CHINESE PEOPLE

##### *The Early Chinese*

In 1926 and subsequent years palæontologists of the Geological Survey of China discovered in the deposits of a cave known as



Chou K'ou Tien, about thirty miles south-west of Peiping, the remains (consisting of two complete and several fragmentary skulls, a number of teeth and several jaws) of a very early human type now known as *Sinanthropus Pekingensis* or Peking man. It is generally admitted that Peking man was 'a direct ancestor of recent man' and lived in early Pleistocene times, probably some 500,000 years ago. The point of greatest interest, however, is that Professor Franz Weidenreich of the Chinese Geological Survey has stated, after careful examination, that certain distinctive features of the remains indicate 'direct genetic relations between *Sinanthropus* and the Mongolian group of recent mankind' and more particularly with Chinese varieties of it.

Upper palæolithic remains in China are very scanty but include a few long-heads rather like those of the same period in Europe, and there is a long hiatus between these and the remains found in late neolithic sites, the period of the painted pottery and black pottery (Lungshan) cultures, briefly described in the historical chapter (see p. 300). The skeletal remains of this period again point to the dominance of human types similar to those of many modern northern Chinese, and the same is true of skulls which have been examined from cemeteries of the Shang dynasty when Chinese civilization was beginning to assume its historical form. Recent evidence, so far as it goes, does not uphold the view, once widely held, that the people responsible for the origins of Chinese civilization came from the far west, but points to their being of the same stocks as the modern Chinese and, indeed, ancestral to them. This, of course, does not minimize the importance of indirect cultural contacts with western Asia, as evidenced by the painted pottery. All that at present can be postulated is that a group in the Hwang ho basin of predominantly Mongoloid types developed, under favourable conditions and contacts, an agricultural technique superior to that of their neighbours and that this group became the first 'Chinese' in the cultural sense.

This brings us to historical times, within which two important movements affecting the racial composition of the modern Chinese have occurred. (1) The descendants of those earliest Chinese—the descendants of the Yellow Emperor' in native phrase—have developed this civilization and spread it widely over what is now Central and South China. (2) Numerous incursions of peoples from beyond the Great Wall have taken place. The effects of both series of movements on the ethnic composition of the modern

Chinese have naturally been considerable. The two series have been closely connected, for the pressure of the Tartar peoples from the steppeland beyond the Great Wall who settled in North China has stimulated the southward migration of many of the original Chinese families, so that the focus of their civilization was gradually transferred from the basin of the Hwang ho to that of the Yangtze. At the same time the Tartar immigrants were themselves gradually absorbed into the cultural complex and became 'Chinese'.

### *The Effects of Tartar Invasions*

The Tartar invasions, occurring in several periods of Chinese history, have come from a wide circuit of lands beyond the Great Wall—from Manchuria, from Mongolia and Central Asia and from north-eastern Tibet. They have included peoples belonging to different linguistic groups (Mongol, Turkish, Tungusic and Tibetan) and different physical stocks. Few if any of the invading groups were themselves homogeneous in race. Those which seem to have made the greatest and most lasting impression on the ethnic composition of the northern Chinese were the hordes of Khitan and Kin Tartars (see p. 335) who flooded much of North China between the tenth and thirteenth centuries, settled down to agricultural pursuits and intermixed with the older inhabitants. The provinces of Shantung, Hopeh, Honan, Shansi, Shensi and south-eastern Kansu were included in the territory of the Kin (Golden) Tartars for more than a century and, in the view of Professor Li Chi, 'their descendants are largely represented in the later population' of this part of the country, particularly in Honan, Shantung and Hopeh. The Kin Tartars came from the Sungari basin of northern Manchuria where the older non-Mongoloid long-headed type, which is still an important element in north-east Asia, was strongly represented. To this source he mainly attributes the large proportion of medium and long-heads in North China, especially in Shantung. In this province the dolichocephalic head-form is frequently accompanied by a leptorrhine nose and other facial features which are not found among the Chinese of the Yangtze valley and the South.

The long-headed element is also present in Kansu, but in this case the influence has almost certainly come from the Koko nor region of north-eastern Tibet where the tribes known to the Chinese as the Ch'iangs frequently encroached on north-west China and the Kansu corridor. It is generally agreed that the Ch'iangs\* are not

\*The term *Tanguts*, employed by European writers, is broadly equivalent.

Mongoloid in physical character but belong to an ancient long-headed stock, with regular features, which may have been the first to inhabit Tibet.

The later historical invasions of China from the steppelands seem to have had little permanent effect on the population. The Mongols conquered all China in the thirteenth century and established the Yuan dynasty. But, unlike the Khitan and Kin Tartars, they kept themselves distinct from the Chinese, and, when the Yuan dynasty was overthrown by the Mings, most of the Mongols were expelled beyond the Great Wall. The later Manchu conquest was of a different character, and most of the Manchu tribesmen were brought into China Proper to maintain the authority of the new dynasty. The Manchu conquest, however, was not effected through weight of numbers but mainly through the dissensions of the Chinese. Numerically the new element was comparatively insignificant. Neither the Mongol nor the Manchu conquest appreciably affected the ethnic composition of the Chinese.

The total results, however, direct and indirect, of the Tartar invasions as a whole have undoubtedly been to modify the physical characteristics of the people of the northern provinces.

### *The Effects of the Southward Movement of the Historical Chinese*

The states of the Yangtze basin (Shu and Ch'u) and the south-east coastlands (Wu and Yüeh), which in the last millennium B.C. were gradually absorbed into the Chinese cultural complex, were not originally Chinese in language or 'race', although their ruling aristocracies probably came from the north. The mass of the people, however, belonged to Mongoloid stocks not very different from those out of which had evolved the historical Chinese of the Hwang ho basin—'the descendants of the Yellow Emperor'. The most important linguistic group, at any rate in the middle and lower Yangtze basin, was almost certainly that of the Shans or Tais, which today is represented by the Siamese and by the Shan-speaking tribes of south-west China and northern Burma. These Shan peoples, essentially southern Mongoloid in their physical characteristics, have been slowly drifting southwards and south-westwards before advancing Chinese for more than 2,000 years, but for the most part they have been completely absorbed by them. It is commonly believed that there is a very large Shan element in the modern Cantonese.

Direct colonization from the north has also, in the aggregate, been

enormous. Every Tartar invasion of the northern provinces caused a southward exodus of the richer and more cultured families who were in a position to emigrate. The carefully-kept genealogies of Chinese clan-families show many of these migrations in detail and a typical example is shown in Fig. 118. Among the provinces of the Yangtze basin which received very large numbers of these northern emigrants, Kiangsu, Chekiang, Kiangsi and Hunan are conspicuous.

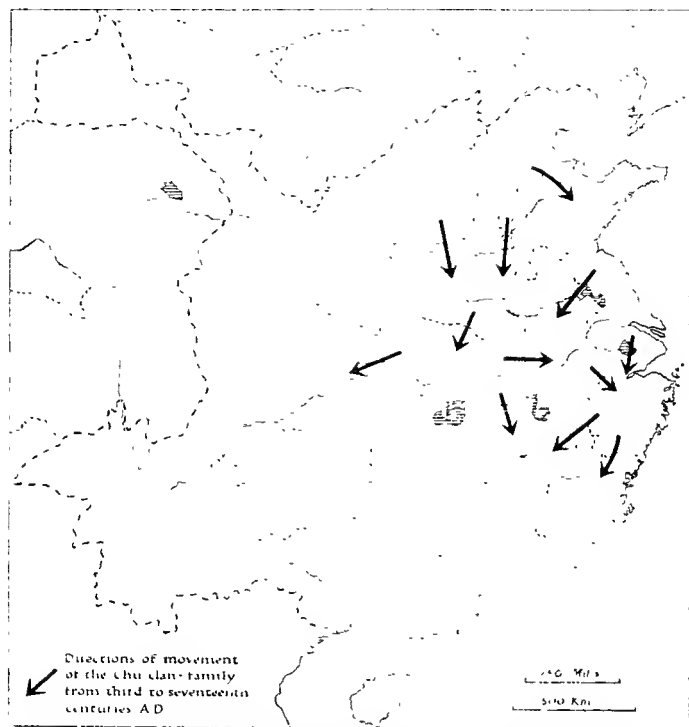


Fig. 118. The southward movement of a clan-family

Based on Li Chi, *The Formation of the Chinese People*, p. 216 (Cambridge, Mass., 1928).

Apart from voluntary migrations, there were also at different periods large-scale settlement schemes by the imperial government of soldier and other colonists in devastated or unruly areas. Large transferences of population took place under the Ch'in, Han and some of the later dynasties. The modern Szechwanese and Yunnanese—apart from the aboriginal tribes—are known to be mainly of northern origin. By the time of the Southern Sung

dynasty (1127-1279), which had its capital at Hangchow in Chekiang, the Yangtze valley had become the centre of Chinese civilization, and today may be considered more representative of the standard Chinese physical type or types than the original cradleland of that civilization in the north.

### REGIONAL CONTRASTS

#### *Contrasts between Northern and Southern China*

A certain distinction may therefore be made between the northern and southern Chinese, with the water-parting between the Hwang ho and Yangtze basins as approximately the dividing zone between them. The differences can easily be overstated; they are not fundamental and are less marked than those between, say, northern and southern Italians. They are, however, appreciable and evident to the eye. The northern Chinese are, on the whole, taller—perhaps, on an average, by nearly 2 in.—and more strongly built. Their faces are longer and more oval and their facial features are more rugged and strongly marked. Pale yellow is the prevailing tint, but quite often with high colouring round the cheekbones, reminiscent of north-west Europe. The southern Chinese conform, on the whole, to the southern Mongoloid type: rather short with broad heads and faces and with rather broader noses; their skin is copper brown with a yellow tinge, and the oblique eye and epicanthic fold frequently occur (Plates 140, 141).

Certain differences of temperament and character between the northern and southern Chinese have often been remarked, but it would be extremely rash to equate them with contrasts of racial types. Profound differences of geographical environment and historical experience have probably been far more influential.

The northerners (the vast majority of whom are hard-working peasant farmers) are certainly more conservative and slower to move, but have the reputation of being well balanced, shrewd and eminently reliable. The southerners are more emotional, quicker witted and mentally more agile; they adapt themselves more quickly to new conditions and are more ready to initiate change. A very large proportion of the radicals and revolutionaries of recent times have come from the south-eastern coast provinces, especially Kwangtung. But there are many kinds of 'South' in China, and all generalization should be guarded.



Plate 141 Southern Chinese  
Fisherman from Swatow.



Plate 140. Northern Chinese  
Buddhist monk from Peking.

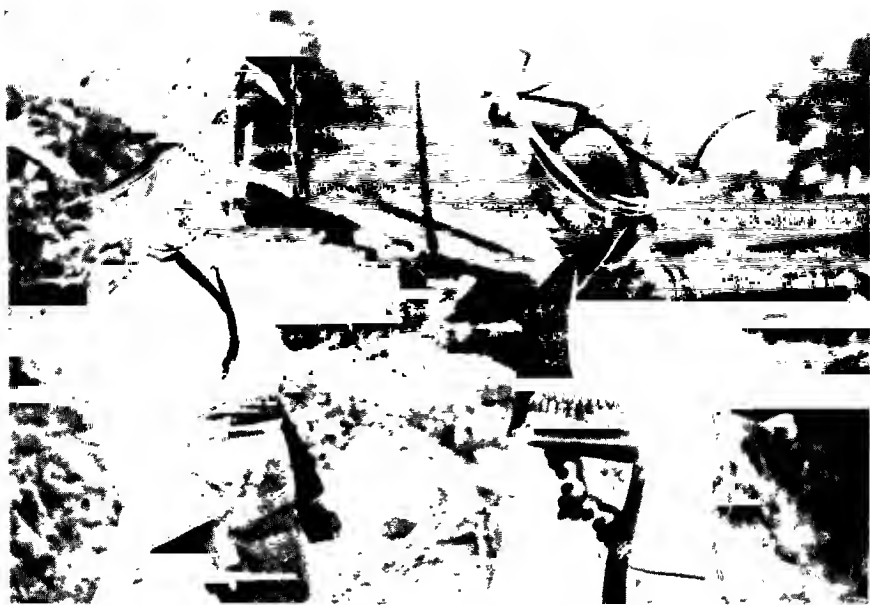


Plate 142. Aboriginal tribespeople, south-east China

These people from the mountainous interior of the South-Eastern Uplands are probably allied to the Miao.



Plate 143. Aboriginal tribespeople, south-west China

Lolo chieftain (right) with attendant, from Haitang, Szechwan.

*Regional Diversity in South China*

It is only in a very general way that one can speak of the southern Chinese as a whole, and to the south of the Yangtze valley important differences should be noted between the ethnic history of (a) the south-central provinces of Kiangsi and Hunan, (b) the provinces (Kweichow and Yunnan) of the high south-western tableland, and (c) the coastal provinces of south-east China. These differences can be understood in the light of their respective geographical conditions and orientation and of the directions followed by Chinese movements of colonization from the north.

(a) *The south-central provinces of Kiangsi and Hunan*, approached by the lowlands round the Poyang and Tungting lakes, were much the most accessible to northern immigrants who, at a very early period, began to colonize the broad valleys of the Kan and Siang. The intimacy of their connection with the Yangtze valley and the north is shown by the predominance of Mandarin speech in Kiangsi and Hunan. Except on the mountainous borders of these provinces, the physical type of the people closely resembles that prevailing in the lower Yangtze region.

(b) *The south-western tableland* was the last part of China to be included within the empire and to receive the full influences of Chinese civilization. The soldier-colonists introduced from the north under the Mongol, Ming and Manchu dynasties were the first important Chinese elements introduced. Their descendants have intermixed considerably with the indigenous peoples, and a large proportion of the existing population consists of unassimilated aboriginal tribes who are discussed in a succeeding section (see p. 427).

(c) *The south-eastern coastal provinces* have had a distinctive ethnic history. Their original inhabitants were known as the Yueh peoples (see p. 318). The composite character of the population in these tangled highlands is evident from Chinese historical descriptions. A dwarf element, probably belonging to the negrito type still found in isolated regions of south-eastern Asia, is clearly indicated as surviving to a late date. A Malay strain, coming by sea and similar to that of the aborigines of Formosa and entering into the composition of the southern Japanese, is strongly suspected. But the predominant element in the Yueh peoples (and their modern descendants) was almost certainly that still represented in the south-west by the Shans, a people belonging to the Tai linguistic family and southern Mongoloid in physical type. Of all the non-Chinese people brought within the influence of the dominant



civilization from the north the Shans have been the most easily assimilated, and the fact that the greater part of south-eastern China was so quickly sinicized, after its initial conquest under the Ch'in and Han dynasties, is believed to be an illustration of it. Except in the case of Chekiang, which was easily accessible from the Yangtze valley, assimilation was not due to the extensive introduction of northern colonists. Immigration of northern families into Kwangtung, partly by sea and partly by way of Kiangsi, did occur on a fairly large scale as the result of the Mongol invasions, but by that time the Nan yueh, or Cantonese as they are now known, had become fully Chinese in the cultural sense.

Isolated Fukien (the old Min yueh) was the last part of the south-east to be sinicized. Its numerous dialects (see pp. 115, 320) are the most distinct and the least intelligible to the mass of the Chinese, and in the interior highlands there are strong indications of the survival of ancient physical types which have not yet been scientifically studied (Plate 142).

*The Hakkas*, probably numbering about fifteen millions, form one of the most remarkable and interesting groups in the south-east. They cannot be classed with the aboriginal tribes but must be regarded as a distinctive Chinese variety which has some of the characteristics of a sub-nationality. The name denotes 'guest people' or strangers. Their ancestors came from the north, perhaps originally from Shantung, Honan and Shansi, and migrated under pressure of the Tartar invasions. There seem to have been several distinct movements, and they did not reach their present habitat in the hills of northern Kwangtung and the neighbouring parts of western Fukien, southern Kiangsi and eastern Kwangsi until Sung and Mongol times. In this mountainous region they have preserved their identity in a very remarkable way. In strong contrast to the prevailing non-Mandarin dialects of south-east China, their speech resembles that of Mandarin which they have brought from the north. Their customs are distinctive, and, in particular, they never adopted the practice of binding women's feet. They are well known for their sturdy independence and virility. In recent times many of them have moved down to the coast cities, such as Swatow, and have engaged in commerce. Together with the Cantonese and Fukienese from Foochow, Amoy and Swatow—these last bearing the name of Hoklos—the Hakkas have played a conspicuous part in building up the prosperous overseas Chinese communities in Indo-China, Malaya and the East Indies (Fig. 122).

## RELIGIOUS COMMUNITIES

*The Chinese Moslems*

In the preceding chapter some account has been given of the religious ideas of the Chinese in connection with the development and characteristics of the historic civilization, which still form the basis of their culture. 'The Three Religions' of China are Confucianism (which includes ancestor worship), Taoism and Buddhism. These, as has been shown in the preceding chapter, are not mutually exclusive, and all of them enter into the fabric of Chinese civilization in every part of the country.

The followers of Mohammed, on the other hand, are regarded by their fellow-countrymen as a distinct and separate group. This was very graphically illustrated by the first flag of the Chinese Republic, with its five colours symbolical of the five 'races' included in China: Chinese, Mongols, Manchus, Tibetans and Moslems.

The origins of Islam in China are very controversial, but the first important contact of the Celestial Empire with the Moslem world occurred in the later part of the T'ang dynasty (A.D. 620-907) under circumstances previously described (see p. 331). The term *Hui-hui*, by which they are often distinguished, is said to be derived from the old Chinese name for the Uigur tribe of Tartars, who were among the first Moslems encountered in Central Asia. Turkestan formed the principal reservoir from which, by way of the Kansu corridor, the original Moslems entered China Proper. Their numbers were greatly increased in the Mongol period. Mohammedan mercenary soldiers, drawn from the Turkish tribes of Central Asia, were extensively employed in the Mongol armies which conquered Yunnan in the thirteenth century under the great leader who later established the Yuan dynasty and is best known as Kublai Khan. To this period the considerable Moslem community of Yunnan owes its origin. It was Kublai who constituted Yunnan as a separate province, and the first governor whom he appointed to administer it was a Moslem. The extensive commerce developed with Central and West Asia under the same dynasty attracted many Moslem traders to China. Most followed the overland routes, but some, coming by sea from the Persian Gulf, settled in the port cities of the Chinese littoral, particularly in Canton. There was a further big accession in the eighteenth century under the Manchu dynasty

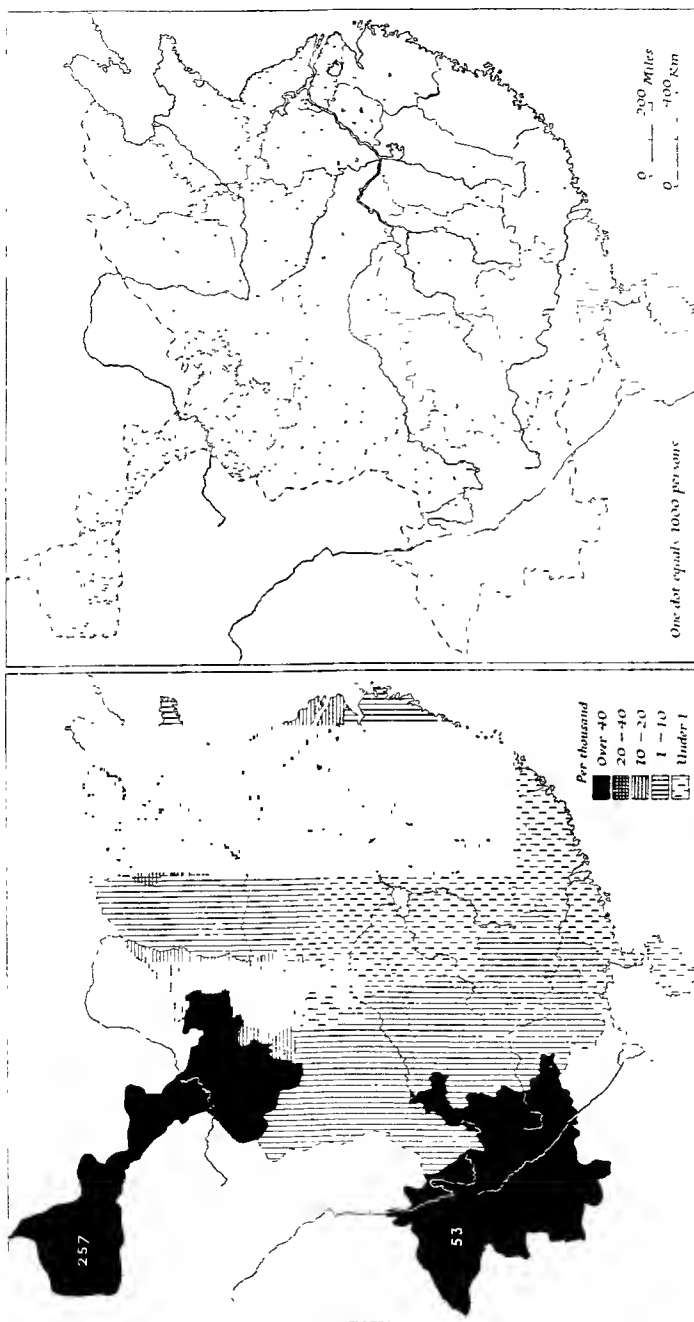
when Chinese trade with Central Asia was at its height and Sinkiang, with a predominantly Moslem population, was constituted as a province of the empire.

*Modern Distribution of Moslems in China.*—These historical circumstances explain the broad distribution of Moslems in modern China. Their total number is very variously estimated, but ten millions seems a probable figure.

Nowhere in China Proper do they form such a large proportion of the population as in Sinkiang (Chinese Central Asia), but the north-west (Kansu-Shensi) and the south-west (Yunnan-Kweichow) contain the largest numbers, and it is these which have been associated with the serious Moslem revolts of the nineteenth century. There are also considerable communities in Canton, Tientsin and Peiping. In many of the central provinces their numbers are negligible (Figs. 119, 120).

Islam in China has not been actively proselytizing, but locally there have been many converts, and children of Chinese, purchased in times of famine, have been brought up in the faith. In this way the original racial distinctiveness of the Moslem communities has been largely but by no means wholly obliterated. For example, the Moslems tend to have more abundant hair and more aquiline features than the average Chinese. Even in Yunnan, where they have long been isolated from the parent stocks, a distinct physical type persists. In this province their numbers were greatly reduced by the drastic measures taken to suppress a great Mohammedan rebellion in 1874.

*Moslem Customs and Outlook.*—The Chinese Moslems tend to follow certain traditional occupations. In the north-west they are leather-workers, caravan leaders and innkeepers. In Yunnan, although they own land and breed stock, they are mainly engaged in trade and transport. Their distinction from the mass of the Chinese is by no means absolute. In speech and external appearance they differ little from them, but their food taboos, particularly abstinence from pork, the favourite Chinese meat, make social intercourse difficult, and they rarely marry outside their own community. Yet there is an increasing tendency to absorb Chinese customs, including ancestor worship, and, apart from the observation of the food taboos and of the obligation to support their own poor and the maintenance, in a modified form, of mosque services, the injunctions of Islam, such as the five daily prayers, are not, on the whole, very strictly followed; relatively few can read Arabic.



Figs. 119 and 120. Distribution of Mohammedans in China

Based on statistics in Broomhall, M., *Islam in China* (London, 1910).

In Kansu, Mohammedans comprise over one-quarter; in Yunnan, one-fortieth of the total population: elsewhere they number less than 2%. The dot map emphasizes the fact that they are found chiefly towards the margins of China.

There is little or no Chinese opposition, official or otherwise, to Mohammedan practices. The serious revolts of the nineteenth century were due not so much to friction on religious issues as to the turbulent condition of the frontier regions and the essentially martial traditions of the peoples involved. The indications are that the Moslems of China Proper, without necessarily losing their identity, will be increasingly assimilated to the general pattern of Chinese life.

### *The Jews in China*

The Jews, never numerous, are now almost entirely absorbed. There was an influx in the later Han dynasty of Jewish refugees from persecution in Babylonia and, along with Arabs and Persians, there were Jewish merchants in Canton from at least the ninth century. The most important and interesting Jewish community, however, was that established at Kaifêng in Honan in the tenth and eleventh centuries when it was an imperial capital of the Sung. This had an important synagogue and retained its identity until the middle of the nineteenth century, but is now virtually assimilated.

### *The Chinese Christians*

The contacts of the historic civilization of China with Christianity have been described in Chapter XI. Four periods of contact may be distinguished :

(1) The first was that of the influence of the Nestorian missionaries, which was at its height in the seventh and eighth centuries under the T'ang dynasty. It closes with the short but severe persecution under the emperor Wu Tsung and in China Proper, although not on its borders, Christianity seems to have become almost extinct by about A.D. 1000.

(2) The second may be called the Franciscan phase, which coincides with the later Mongol period, when the Central Asian routes were again open and when Kublai Khan and his immediate successors in the Yuan dynasty were essentially tolerant and receptive of western influences. Beginning with the mission of John da Piano di Carpine as papal envoy to the emperor, the efforts of the Franciscans led to the establishment of the first Catholic church in Cambaluc (Peiping) in 1298. In 1313 John de Montecorvino became Archbishop of Cambaluc and Patriarch of the Orient. A bishopric was also established at Ch'üanchow (the Zaiton of Marco Polo). At the height of this phase there are said

to have been 30,000 converts, but probably a considerable number of these were outside the limits of China Proper. The downfall of the Yuan dynasty brought this phase to an end. With the advent of the Ming dynasty and the closing of the western trade routes by the Turkish irruptions, Christianity in China again died away.

(3) The third period was associated with the development of the sea route to China from the west and the remarkable work of the Jesuits who availed themselves of it. The great pioneer was Matteo Ricci who, with imperial approval, made Peking his centre in 1601. He had many eminent successors who had much influence with the early Manchu emperors and made several highly placed converts. The prestige of the Jesuits among the Chinese *literati* and in court circles was in part due to the deep impression made by their mathematical and scientific attainments, but the Roman Catholic Church appeared firmly established and is said to have had a membership of 300,000 in 1700. Further progress, however, was arrested by the celebrated Rites Controversy (see p. 355), turning on the recognition by Christian converts of ancestor worship and of the obligation to pay honour to Confucius. Imperial sympathy changed to deep distrust, and the eighteenth century saw the renewal of persecution and the papal suppression of the Jesuit order. The Roman Catholic Church in China survived but dwindled, so that by 1800 membership had fallen to 200,000.

(4) The modern period began in the early nineteenth century with the evangelical movement and the revival of missionary zeal in Western Europe. Its first fruits in China was the arrival in Canton of the pioneer Protestant missionary, Robert Morrison, sent out by the London Missionary Society in 1807.

*Christianity and International Politics in China.*—The new movement had not proceeded far before it became involved in the political issues connected with the status of the nationals of European powers in the Celestial Empire. The extra-territorial rights, acquired by Great Britain and other Western nations under the Treaties (beginning with the Treaty of Nanking, 1842) imposed upon China, extended to missionaries as well as to officials and merchants. Under pressure, the imperial government conceded toleration to Christianity. The missionary efforts of Roman Catholics were specially recognized in the Treaty of Tientsin with France in 1858 after the Sino-French war, and the Convention of Peking two years later stipulated that: 'It shall be promulgated through the length and breadth of the land that it is permitted to

all subjects in all parts of China to propagate and practise the teachings of the Catholic religion '.

For more than half a century the missions, Roman Catholic and Protestant, worked under the cover of these guarantees and by the majority of Chinese were considered as agencies for the extension of the commercial and political influence of the powers concerned. To Great Britain and America fell the task of safeguarding the Protestant missions; France, the chief Roman Catholic power having treaty relations with China, assumed for a time the exclusive privilege of protecting Catholic interests. In the late nineteenth century, during the scramble among the European powers for concessions and spheres of influence, cases occurred of the murder of missionaries being made the pretext for aggression, the most notorious example being that of the German seizure of the important harbour of Tsingtao in Shantung in 1898. Chinese converts to Christianity were sometimes termed 'secondary foreign devils' by their fellow-countrymen, and were singled out for vengeance in the anti-foreign Boxer Rebellion of 1900, when more than 30,000 perished.

The immense handicap to their work of entanglement with political and international issues was by this time acutely realized by many missionaries and their societies. Since the formation of the Chinese Republic in 1912 increasing stress has been laid upon the importance of building up genuine Chinese Christian communities, managing their own affairs. The Protestant missions expressly repudiated the protection of extra-territorial rights several years before the recent arrangements by which these have been brought to an end by the most important powers concerned. In its turn the national government of China guarantees complete freedom of religious opinions and organizations.

It would be too much to say that missionary work in China has entirely lived down the earlier suspicions of its motives. The fierce outbreak, fanned by communist propaganda, against Western imperialism, which marked the middle 'twenties' of the present century, for a time revived them, but this also has now largely subsided. A more lasting cause is probably to be found in the average Chinese mentality, which tends to think of all religions as different ways to one goal and finds it difficult to believe that people should come from a distant country and adopt an entirely different mode of life simply in order to proclaim the exclusive validity of a single creed.

On the other hand, the great contribution which the missionary societies and their Chinese converts have made to the rebuilding of the national life has made a deep and lasting impression. It is recognized that they were the pioneers in the development of China's new system of education and in the introduction of modern medical and hospital services, and that the graduates of Christian middle schools and colleges have played a notable part in almost every aspect of social reform and political reconstruction. At a time when Confucianism, family life and all the traditional sanctions of the old civilization seemed to be crumbling, the heads of thousands of Chinese families have sent their sons and daughters to be educated in Christian schools because they valued the moral influences and atmosphere which, they realized, were to be found in them. Many of these schools and colleges now form an integral part of the national system of education, receiving Government grants on the single condition that direct Christian instruction is optional and not compulsory. The fact, too, that Generalissimo and Madame Chiang K'ai-shek and several other national leaders of contemporary China belong to it has greatly increased the prestige of the Christian community whose importance and influence are undoubtedly far in excess of its numerical strength.

*Statistics and Organization.*—The total membership of the Christian community, according to the latest available statistics (1936), is close on four millions, approximately 1 per cent. of the whole population. The main distinction is between the Roman Catholic and Protestant churches.

(1) The total number of Roman Catholics in China rose from three-quarters of a million in 1900, the year of the Boxer Rebellion, to nearly two millions in 1920 and over three millions in 1937. Many religious orders participate in the activities of the Church, including those of the Augustinians, Dominicans, Franciscans, Lazarists and the Jesuits. The Jesuits returned to China in 1842 after the revival of their order, and have maintained the high traditions of scientific research which brought them such renown in late Ming and early Manchu times. The observatory and research station at the Roman Catholic village of Zikawei near Shanghai, which has done invaluable work in the forecasting of typhoons and other aspects of meteorology, is the chief monument of this scientific activity. Two notable Roman Catholic universities are located at Shanghai and Peiping, the latter of which has maintained its existence during the Japanese occupation. Scattered over the



country are fourteen central seminaries. It is the policy of the Roman Catholic Church in China to 'lose the character of a mission and assume that of a regular, normal, native church', so there is a progressive effort to create an indigenous clergy and hierarchy.

(2) One of the chief features of the Protestant missions and churches in China has been their multiplicity. Over 100 societies, representing nearly all the denominations found in the United States, Canada, Great Britain, Scandinavia and northern Europe, have established missions and churches. Many of these, however, are now members of the Church of Christ in China, which is developing as the chief native Protestant church with the largest membership. There is also an important National Christian Council on which nearly all the leading Christian communities are represented, and which exists to co-ordinate Christian work and activities and to encourage co-operation.

The returns of 1935-6 gave a total of 618,000 baptized and 536,000 communicant members for all the Protestant churches of China. Of these nearly a quarter were members of the Church of Christ in China. The proportion of native to foreign members of the staffs has been steadily rising and in 1936-7 was about 9,500 Chinese (including over 2,000 ordained ministers) to about 5,750 foreigners.

The medical and educational activities of several of the Protestant denominations are outstanding. They maintain about 300 hospitals and a staff of over 600 doctors, of whom about 67 per cent. are Chinese. The number of elementary schools maintained in 1936-7 was 2,795 and of middle and higher schools 255. At that date there were also twenty-one Christian institutions of college grade with over 7,000 students. Of these rather less than one-fifth came from Christian homes. Several of the most distinguished men in the public life of modern China are graduates of these Christian universities, such as St. John's, Shanghai, and Yenching University near Peiping. It was as centres of potential leadership that the universities, National and Christian, were singled out for bombing attack by the Japanese, but many of these have, by immense effort, been reconstituted in Free China of the west, and the Christian universities from the north and east are now (1944) mainly grouped at Chêngtu, the provincial capital of Szechwan.

The impact of Christianity on China has been one of the factors responsible for the decay of the older forms of animism and polytheism, which in the past have constituted a large part of the

religious practices of the Chinese masses. With Buddhism its relations are, on the whole, friendly, although it has not made so marked an impression on its outlook and organization as in some other oriental countries. More intimate is its connection with the recent revival of Confucianism, especially as manifested in what is known as the New Life movement, sponsored by the Generalissimo and Madame Chiang K'ai-shek, which stresses the inculcation of the Confucian virtues of altruism, courtesy, uprightness, integrity and modesty. The Chinese, as a whole, judge a religion by its proved ethical value rather than by its theology and, on this plane, good Confucianists welcome the co-operation of the Christian community.

## II. THE ABORIGINAL TRIBES OF SOUTHERN CHINA

### REASONS FOR COMPLEXITY

In southern China, but particularly in the south-west and most of all in the province of Yunnan, there still exists a bewildering diversity of tribal groups, speaking different languages and dialects and showing also considerable differences of physical type. Similar differences formerly existed in North and Central China, as is indicated by the early historical records such as 'The Tribute of Yü', but have now been smoothed out by the Chinese capacity for assimilation and amalgamation. It is unlikely, however, that they were ever on the same scale of complexity, for the geographical orientation and the topographical conditions of the south-west are peculiarly favourable to diversity. It is so placed that human drifts towards Indo-China from the heart of China Proper, from the borders of Tibet and from the eastern Himalayas here converge, while, on the other hand, the tremendous complexity of the relief has prevented fusion (Fig. 39).

The tribal groups, as now found, are chiefly in inaccessible hill regions and are fragmentary remains of larger and more coherent groups which have been pressed out of the fertile basins and valleys by the stronger, incoming Chinese. Many of them still rely mainly on rice cultivation, originally carried on in the lowlands, but which they now practise with difficulty on uplands that they have extensively deforested; the bare character of many of the hills of South China seems to be largely due to the clearings made by these migratory tribes in their wanderings. In some instances, however,

they have established themselves in particular tracts of mountain country and carry on trade with Chinese merchants in market towns which have grown up at the base of the hills. The process of assimilation begins in these borderland zones, and in recent times government bureaux have been established in the market towns to hasten it by the spread of the state system of education.

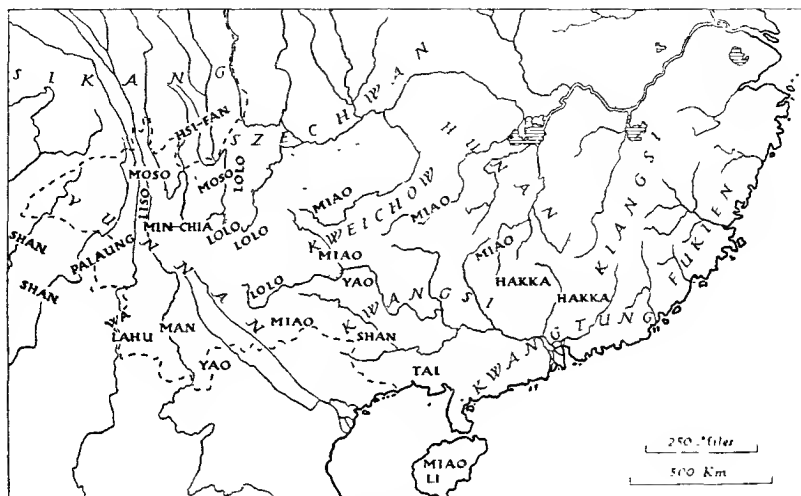


Fig. 121. Aboriginal tribes in South China

Based on (i) Hermann, A., *Historical and Commercial Atlas of China*, pp. 66-67 (Cambridge, Mass., 1935); and (ii) Fitzgerald, C. P., *The Tower of Five Glories*, map (London, 1941).

The degree of resistance to assimilation varies greatly both with the character of the terrain and the antecedents of the different tribes. The generalization, however, may be made that the process is in operation almost everywhere and is being accelerated by the strong motives for the economic development of south-west China occasioned by the Japanese occupation of the north and east.

### CLASSIFICATION

Although in recent years considerable attention has been concentrated on these tribal peoples, any coherent classification of them is extremely difficult. In many cases, such as those of the Miao and Yao, members of the same linguistic group are now so fragmented as to exhibit different cultural characteristics in the varied and

often widely separated localities which they inhabit. A wide divergence of physical types may be found within the same tribal series, such as that of the Lolos. The different languages spoken incorporate so many loan words from each other as sometimes to make it doubtful from what original linguistic stock a particular dialect has been derived (Plates 142, 143).

### *Linguistic Grouping*

It is on a linguistic basis that classification is usually attempted, but complete agreement has not yet been reached. For south-eastern Asia and the southern Pacific as a whole two large linguistic families are distinguished. The one is called the Sino-Tibetan or Sinitic family and includes Chinese and the Tibeto-Burman languages spoken in southern Tibet, the greater part of Burma and the regions of south-west China adjacent to Tibet and Burma. To this linguistic group belong the various Tibetan tribes of what is now the large Chinese province of Sikang, carved out of south-eastern Tibet, and also the so-called Lolo group of tribes (Nosu or Lolo proper, Liso, Woni and Lahu) living within China Proper in western Szechwan and parts of Yunnan (Fig. 121).

The other large linguistic family is now often called the South-Eastern Asiatic, to include the Austronesian (Indonesian, Melanesian and Polynesian) and Austroasiatic divisions. The Austroasiatic group includes several languages spoken by various tribes widely scattered between the South China sea and central India (Munda speaking peoples) and has its chief focus in Indo-China. Here it is represented by the *Mon-Khmer* speaking peoples. The term Mon is derived from a group now located between the mouths of the Irrawaddy and Salween rivers in the extreme south of Burma, at the head of the Gulf of Martaban round the town of Pegu. Khmer is the national name for the Cambodians. Annamite, the language of the Annamese nation, is closely related to it and has recently been described as 'the north-easternmost member of the Mon-Khmer stock'. To this group are assigned a number of small and scattered tribes, mainly living in Burma but partly on the Chinese side of the border, known collectively as the *Wa-Palaung*. More doubtfully belong to it the larger and more important tribal groups of the *Miao* and *Yao* in Kweichow, Kwangsi and parts of the adjacent provinces.

The chief controversy at the present time concerns the linguistic affinities of the widely-spread *Tai* speech, represented by the national language of Siam and by the Shan dialects of northern

Burma and of many tribal groups in southern Yunnan and the island of Hainan. Until recently Tai and all its Shan dialectical varieties have been unhesitatingly placed, along with Chinese and the Tibeto-Burman languages, in the Sinitic or Sino-Tibetan major family. Within the last few years, however, the view has been put forward by more than one authority that their basic affinities are rather with Mon-Khmer and the Austroasiatic group of the South-Eastern Asiatic family and that their apparent similarity to Chinese is the result of the gradual incorporation of a very large number of loan words.

It is at least certain that all the non-Chinese languages within southern China Proper have for many centuries been receding southwards and south-westwards and are being progressively sinicized. It is also important to note that the international boundary between China and the states to the south (French Indo-China, Siam or Thailand and Burma), trending as it does approximately east-west from the Gulf of Tongking, cuts transversely across the linguistic zones which run from north to south. The non-Chinese languages spoken by the aboriginal tribes of southern China find their fullest development and expression in the national languages of these states.

### *Racial Aspects*

The predominant physical type among these aboriginal tribes is southern Mongoloid, not dissimilar in essential respects from that of the Chinese. There is recognizable, however, a distinct non-Mongoloid element, which is still more conspicuous in Indo-China and the southern archipelagoes, from which it gets its name of *Nesiot* or *Indonesian*. The characteristics of this type, wherever it is found in a relatively pure form, include a dolicho- or mesocephalic head-form, with an oval face, small cheek bones, a straight and fairly prominent nose, eyes straight without the epicanthic fold, a skin not yellow, but brownish or swarthy, as in southern Europeans, and hair tending to be wavy and chestnut in colour. It is believed to have close affinities with the so-called Brown Race of the Mediterranean, North Africa and India, and was probably widespread over south-eastern Asia before the great southern expansion of the Mongoloid type which has now largely overlaid and submerged it.

Among the aboriginal peoples of southern and western China who display many of these characteristics may be noted the Yao,

who have a greater percentage of types with chestnut and slightly wavy hair than the Chinese and, more particularly, the Nosu or Lolo proper of western Szechwan, whose fair skin, regular features and tall stature have been noted by many travellers. These have long maintained a position of virtual independence in the Taliang shan and the Kiench'ang valley, the main passageway between Szechwan and Yunnan. Farther south in the latter province are other Lolo tribes, who are smaller and much darker and are being absorbed by the Chinese. The tall Lolos of the north are believed to represent the original stock.

### *Cultural Aspects*

To the social anthropologist south-west China is a vast museum of immense richness and variety. In their customs, social organization and cultural development the tribes vary greatly and range from primitive head-hunters, such as the Wa tribe between the Salween and the Mekong, to skilful rice cultivators with an elaborate social organization, such as the Min Chia of the Tali plain in Yunnan.

In the main, the Shan-speaking peoples show the greatest social affinities to the Chinese and most readily respond to the culture of the dominant civilization. This is partly the result of closer contact. In south-western Yunnan occurs an interesting exception to the general rule that the aboriginal peoples are confined to inaccessible hill country and that the Chinese are in possession of the basins and valleys. Here the Shans are in the valleys and the Chinese villages are rarely found below an elevation of about 4,000 ft. on the plateau. The probable reason is that the Shans are better acclimatized to the humid, tropical conditions of the valleys than the Chinese, who are relatively newcomers from more northern latitudes.

The adoption of Chinese writing is the first step towards assimilation. Few, if any, of the tribes had developed writing on their own account. The Nosu of Szechwan had their own ideographic script but it was probably originally derived from Chinese characters and is now being superseded by the standard script. The Yao priests use hand-copied books from Chinese Taoist sources for the exorcism of ghosts. The Min Chia, in close contact with the Chinese on the Tali plain, availed themselves fully of the facilities which the imperial civil service examinations used to offer for obtaining important administrative posts.

In the case of the Min Chia, indeed, political assimilation is now almost complete, but they retain their own distinctive social system, differing in many features from that of the Chinese. They do not, for example, practise exogamy but may marry members of families with the same surnames as themselves and paternal cousins of the same generation—practices quite contrary to the Chinese code. So, too, instead of reverencing the primary ancestor of the clan group, they invest the village community, although it may be made up of many different families, with a supposed common 'founder' as the object of special honour, thus giving a common bond, making for cohesion, to all the villages.

Improved communications, *corvées* for the construction of new trunk roads (the Burma Road, for example, was chiefly built by the labour of aboriginal tribesmen) and the use of the modern simplified script for mass education are now all working towards the reduction of differences. Assimilation, however, is very far from complete, and the future prospect of difficult minority problems on the Burmese, Tibetan and, in the north, the Mongol frontiers is likely to be averted only by the development of a specially trained and understanding borderland administration, such as many Chinese officials have begun to advocate.

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## Chapter XIV

### THE CHINESE WRITTEN LANGUAGE \*

General Features: The Evolution of Chinese Writing—Pictograms, Ideograms, Phonograms: Varieties of Script: Printing: Lexicography: Characters in Combination: Peculiarities of Chinese Composition: Proposed Substitutes for Chinese Characters: How can Chinese Writing be kept up to date?: Bibliographical Note.

#### *General Features*

In Chinese, as in all other languages, writing began as an attempt to record human speech and give it a permanent form. But owing to certain factors which we shall have to discuss, it has never been so closely linked with the spoken word in China as it is in other countries, and in course of time the language of books diverged ever more widely from the language spoken by the people. Hence it is impossible to give a direct and unqualified answer to the question whether Chinese is difficult to learn. For while the spoken language is fundamentally one of the simplest in the world, the written language is certainly the most difficult. Both these statements need some explanation.

Chinese is monosyllabic, and the different syllables which it comprises are comparatively few in number. There are in fact not nearly enough of them to go round, and therefore each one has to do duty for a number of different meanings. This of course would lead to hopeless confusion were it not that Chinese words are all subject to differences of intonation. The so-called 'tones' are regular modulations of the voice by means of which different inflections can be imparted to the same sound, and they form an integral part of Chinese words. In Pekingese, the dialect which has evolved furthest in the direction of simplicity, four tones are distinguished: the even tone, divided into upper and lower, the rising tone, and the departing tone. These may be illustrated by

\* *Editorial Note.*—For a comprehensive view of the present linguistic position in China and the problems which it presents this chapter and the one which succeeds it should be read in conjunction: both are written by authorities eminent in their respective spheres. It will be seen that somewhat different views are expressed as to the significance and value of the modern reform movements represented by *pai hua* and *Gwoyeu Romatzyh*. These differences of view are reflected in contemporary Chinese opinion, and it seems best to leave the lucid and authoritative expressions of them here given untouched, and not to attempt a harmonization which would be artificial and misleading.



taking an English word and pronouncing it in certain ways expressive of different emotions. Thus, a man may say 'dead' in a monotonous and slightly plaintive manner. Somebody else will repeat the word, first interrogatively, and then incredulously, the voice rising in a sort of curve; whereupon the first speaker once more, but this time in a decisive tone, says 'dead'. This little dialogue gives a fair approximation to the four Pekingese tones. Now, it may be said that the correct rendering of the tones is the only element of real difficulty for those who are learning to speak Chinese, though of course they are acquired quite naturally and unconsciously by anyone who is brought up from infancy among Chinese people.

The written language of China is difficult, firstly because of the enormous tax on the memory involved in learning to read and to write thousands of characters, some very complicated in structure, and secondly because of the way in which these characters are combined in a sentence, so as to give a required meaning. If only it were possible to transcribe the characters—that is to say, the syllables which they represent—in the letters of an alphabet so as to be intelligible to a reader, then indeed the language would assume a much simpler form, seeing that every Chinese word is entirely free from inflexion or agglutination, and that there is nothing in the nature of grammar to burden the memory. But so far, in spite of many attempts, it has not been found practicable to dispense with the characters merely by the process of alphabetizing them.

*The evolution of Chinese writing—Pictograms, Ideograms, Phonograms*

After these preliminary remarks, we may proceed to trace the evolution of Chinese writing, though many of its stages are but imperfectly known to us. In the first place, it can be stated with confidence that Chinese in its earliest phase was picture-writing; that is to say, when the primitive scribe wished to tell others that he was thinking of some particular spoken word denoting an object, he drew a simple picture of it. That is the way in which all writing is believed to have begun, and in the Egyptian hieroglyphs we see another example of it that has been preserved to the present day. A certain number of characters in common use today are really nothing more than pictures, some of them still recognizable

as such, others distorted or conventionalized beyond easy recognition. Most of these pictograms, as we shall call them, represent natural objects. Thus, we have the sun ☼ and the moon ☾, now written 日 and 月 respectively; 山 (山) mountain, 木 (木) tree, 果 (果) fruit, and 雨 (雨) rain (drops falling from heaven); 牛 (牛) ox, and 羊 (羊) sheep, each with characteristic horns; 鳥 (鳥) bird, 魚 (魚) fish, and 馬 (馬) horse, are rather more elaborate. There are also many pictograms relating to man (人, now 人). This, by the way, is not a picture of two legs, as is often stated, but of a human form with one arm and one leg, seen in profile. 女 (女) is a somewhat unflattering picture of a woman, shown in full face; and 子 (子), child, seems to depict an infant with its legs swathed. Among parts of the body, 目 (目) eye, 眉 (眉) eyebrow, 耳 (耳) ear, 口 (口) mouth, 心 (心) heart, and 手 (手) hand, are all well indicated. 田 (田) field, shows the demarcation of land, 車 (車) is a good picture of an ancient cart (seen from above), 皿 (皿) is a bowl with two handles, 糸 (糸) is silk, showing cocoons and threads. In 聿 (聿) we have a hand grasping a stylus, the oldest writing instrument. Less purely pictographic is 言 'words' or 'speech': a mouth with something coming out of it.

Allied to the pictograms proper are a few characters which might be regarded as a separate group and called indicative symbols. Such are the numerals one to three (一, 二, 三) and the signs for 'above' (上), 'below' (下), and 'middle' (中).

Several hundreds of pictograms must have become current at an early date, but they could obviously be used only for concrete objects of a simple appearance, whereas the spoken language also contained words denoting not material things but qualities, actions, and other abstract ideas, which could not well be represented pictorially. In order to express these, the Chinese began by combining two or more pictures in a single 'suggestive compound'. The sun and the moon, for instance, placed side by side, suggest the idea of brightness: 明; the sun rising behind trees, the east: 東; a woman with a child, goodness or love: 好; two men on the ground, to sit: 坐; a hand shading the eye, to look: 看; a dog with two mouths, to wail or howl: 哭; a hand gripping an ear, to seize: 取. 'Man' and 'words' together make 信 'believe' or 'truth', showing traditional faith in the goodness of human nature. Other words recall the time when the Chinese were

predominantly a pastoral nation ; a ' big sheep ' expresses the idea of beauty (美), and ' my sheep ' the sanctity of private property, hence ' righteousness ' (義). Here it should be noted that the part meaning ' I ' or ' my ' is itself in all probability a suggestive compound consisting of a hand holding a spear. ' Danger ' is suggested by a man on the edge of a precipice (𠂇), afterwards expanded into 危. 門 is the pictogram for a folding door, and 闔 is its bar or bolt. Add two hands removing the bar, and you get the character 開 ' to open '. These are all examples of a type of character which, though composed of two or more pictures, is not itself a picture but rather the symbol of an idea, which may conveniently be called an ideogram. This word, or ' ideograph ', is often used for Chinese characters in general ; but it is better to confine it to those which represent not an object but an idea.

Whereas the picture-writing of Egypt gradually developed into an alphabet, in China the characters never underwent any such transformation, but remained indivisible units, each a complete word in itself. Moreover, during the early stage of the written language, which we have been considering, no indication of sound entered into them at all. 人 is the figure of a man, and it is read *jén* simply because in the spoken language that is the pronunciation of the word meaning ' man ' ; but so far as its structure goes, it might equally well be read ' man ' or ' homme ' or ' Mensch ' ; it contains no clue to its pronunciation such as is conveyed in our own word spelt m-a-n. The Arabic numerals are symbols of a similar kind : 1, 2, 3, etc., are read by us one, two, three ; but the French read them un, deux, trois, and the Germans eins, zwei, drei. We find it very convenient to have these international figures, and thanks to the decimal system ten of them (including a nought) suffice to express any number whatsoever ; but if there were thousands of such figures, arithmetic would be intolerably burdensome. For much the same reason the Chinese found that the mere multiplication of pictograms and ideograms could not solve the problem of constructing a practical script. And thus they were led to adopt an ingenious device which revolutionized the whole system of Chinese writing by bringing it into closer touch with the spoken word on the one hand, and, on the other, facilitating the creation of an indefinite number of characters which could never have come into being by the pictographic or ideographic method alone.

Chinese, as we have said, suffers from a paucity of sounds, though their number varies considerably in different dialects. Cantonese has 780 syllables, but in Northern Mandarin or Pekingese there are no more than 420, even when these are eked out by the occurrence of an aspirate, or expulsion of the breath, between certain initial consonants and the vowel (e.g. *ch'ien*, *p'an*, *t'ung*). Now, in ordinary speech there are several thousands of words in common use, and for literary purposes the number may rise to 14,000 or more. It is obvious, then, that there must be a large number of words with the same sound that are wholly different in meaning. Take as an example the syllable *fang*, which has at least a score of meanings: square, street, house, dawn, barge, kettle, fragrant, resembling, spin, hinder, guard against, inquire about, let go, etc. For the first meaning, 'square', the symbol 方 (originally representing two boats tied together) was adopted; but the Chinese did not proceed to invent other symbols for each of the words mentioned. At first they contented themselves with borrowing this ancient pictogram 方 for the other meanings as well, trusting to the context to make it clear which particular *fang* was intended. This, however, was not satisfactory, so for each word they took another character to indicate roughly the class of things to which it belonged, and wrote the two in combination. *Fang*, a street, then appeared as 坊 'earth-*fang*'; a house, as 房 'door-*fang*'; fragrant, as 芳 'grass-*fang*'; to spin, as 紡 'silk-*fang*'; to inquire, as 訪 'words-*fang*'; and so on. Characters of this kind are phonetic compounds or phonograms, in which one element, called the phonetic, gives the sound (or in some cases, as we shall see, only an approximation to it) and the other a clue to the sense. The latter is usually called the radical, though a more appropriate term would be classifier.

We have taken a simple example to illustrate the principle on which these new characters were composed; but other cases are not quite so straightforward. There are syllables like *li*, for instance, which can mean over a hundred different things, distributed among twenty or more phonetics. One of these phonetics is 里 *li*, a hamlet, from which is derived a series of characters including 狸 *man-li*, rustic, 狸 *dog-li*, fox, 鯉 *fish-li*, carp, and many others; but 埋 'to bury', with the radical 'earth', is now read not *li*, but *mai*, a change in the actual pronunciation of the word which the written

character was incapable of recording. Furthermore, 里 itself is not a single pictogram like 方 but an ideogram made up of 田 *t'ien*, field, and 土 *t'u*, earth. Other *li* phonetics are more complicated still. Thus, 离 (originally a picture of a boggy) has a number of derivatives read *li*, among others 離 'to separate'. But this character also serves its turn as a phonetic, combining with the radical 'bamboo' to make 籬 *li*, a wattled fence. And, again, other derivatives such as 螭 are read not *li* but *ch'ih*. Phonetics, then, are not necessarily simple pictograms, nor do they always indicate exactly the sound of the whole character. A few of them are obsolete as independent characters, yet their family of derivatives may be very large. Imperfect instruments though they may be, they have nevertheless enabled the Chinese to extend their written language as far as they pleased. About 800 are now in use, and out of the 49,000 characters included in the standard dictionary of the Emperor K'ang Hsi over 85% are phonograms.

Etymologically, all compound characters can be decomposed into certain elements which are called primitives because with them all analysis ends. The character 歸 *kuei*, for instance (of which the phonetic, strangely enough, is 自 and the radical 止) falls into five component parts, the others being 彳, 辶, and 巾, none of which can be further subdivided. In a calligraphic sense, of course, everything is really built up from single strokes of the brush of various kinds, such as dots, curves, hooks, and vertical or horizontal lines. But this reduction of characters into their strokes is in no way comparable with the analysis of our words into letters of the alphabet, for the strokes by themselves have no significance, phonetic or other. The counting of strokes, however, has been found very helpful in the classification of characters, as we shall see when we consider the making of Chinese dictionaries.

After what has been said, it is hardly necessary to point out that the body of Chinese characters cannot be divided into two distinct groups, radicals and phonetics. These terms are fluid, and overlap to a large extent. 土, which is the pictogram for 'earth' (with vegetation coming out of it), is one of the more important radicals, but there are many common characters such as 吐 or 杜, in which it appears as the phonetic, with another radical affixed to it. So with the primitives or indivisible elements: many of these are radicals, but some are also used as phonetics,

or may enter into the composition of either without any individual influence on the sound or the meaning. In the great majority of cases, it is an easy matter to divide a character into radical and phonetic. The usual position of the radical is on the left-hand side, but sometimes it appears consistently on the right, or above the phonetic, or below it. If the radical cannot readily be spotted, it may be because it is not the true radical at all, but has been arbitrarily selected for that function by lexicographers. Pictograms and ideograms, having no radicals in the strict sense, have had to be artificially furnished with them (unless radicals themselves) in order that they might be classified in the same way as phonograms.

Before passing on from this subject, we may note that a Chinese writer of the 13th century distinguished six classes of characters known as the Six Scripts—a very misleading term which would be more applicable to different forms of handwriting. These include, besides the four that we have mentioned, a class of 'borrowed characters' occurring only in a primitive stage of the language, before homophones had acquired distinctive radicals. The use of 帚 a broom for 'wife' (afterwards written 婦), as seen in the character 歸 above, falls within this category. Exactly what is intended by the sixth class, 'inverted characters', is very doubtful, but it seems to refer to characters that are inverted, or turned round, in a purely physical sense. According to this explanation, 后 would be an inverted form of 司. It is an illogical division of no importance, and need not detain us.

### *Varieties of script*

Until recently, the oldest specimens of characters were to be found only on bronzes of the Shang dynasty, dating from the second millennium B.C. The inscriptions are not long enough to tell us much about the state of the language at that time, but it is evident that the purely pictorial stage had already been left behind, and that the phonetic principle had been introduced, though the differentiation of homophones by means of radicals was not fully developed, and borrowed forms are frequent. Towards the end of last century several thousands of inscribed bone and tortoise-shell fragments, also of the Shang dynasty, were dug up in Honan near the site of the old capital. These had been used for purposes of divination, and the inscriptions they bore were questions on all

sorts of subjects addressed to the spirits of royal ancestors. The characters thus preserved are even more baffling than those on the bronzes, and nearly half of them still remain undeciphered ; but here again we can detect the phonetic principle in operation, without which, indeed, very little writing of a connected sort would have been possible. The characters are carved with some sharp instrument, and this method of writing the *ku wên* or ancient script seems to have persisted until about the middle of the Chou dynasty, which followed the Shang, when scholars still wrote with a knife-pen on small tablets of wood or bamboo. Then a new style of writing was evolved, the so-called Great Seal, of which few original specimens survive, those on the Stone Drums, ten boulders found half-buried in Shensi, being the most famous. This script, however, was never standardized, and each of the feudal States used its own style until the reign of the First Emperor in the 3rd century B.C. Uniformity was then restored by the invention and compulsory use of the Small Seal, known to us chiefly through an epoch-making dictionary of which we shall speak presently. The older script was much simplified, and the number of strokes reduced ; but the characters were often reshaped in a form that tended to obscure their true derivation. The vogue of the Small Seal, however, was short, and though it is still universally used for seals, for most practical purposes it was soon superseded by the *li shu* or official style, which is much more nearly akin to the handwriting of to-day. *K'ai shu*, the 'clerkly' or 'pattern' style, was brought to perfection by the great calligraphist Wang Hsi-chih in the 4th century A.D., and has held the field ever since as the plainest and best medium for daily use. Before this, however, two other styles had been evolved ; the 'running hand', in which, as the name implies, there is a greater freedom of movement, and the 'grass character', a species of shorthand in which many strokes are abbreviated or omitted.

Most of the above changes were no doubt due in great part to successive improvements in the tools or mechanical means by which writing was produced. The metal stylus or knife-pen seems to have been superseded first by a sort of stubby pencil of frayed bamboo which was dipped in black varnish or some other kind of primitive ink, and then by the writing-brush made of animal hair fixed into a hollow reed or bamboo stem. At what

precise date this was first introduced is uncertain ; but all the evidence points to its having been in general use as early as the second century B.C., when an improved kind of ink, made into cakes, began to be manufactured out of a mixture of lamp black and glue. From the antiquarian's point of view it is unfortunate that these inventions should have modified the script so profoundly that many of the original forms were forgotten and false interpretations became current ; but, on the other hand, the graceful flowing strokes which were obtainable through the flexible tip of the brush-pen created a new form of beauty which has no parallel in the West, and the art of calligraphy was born. Its development was further hastened by yet another invention, one of the most far-reaching in the history of mankind, when paper was first made during the Latter Han dynasty by the eunuch-scholar Ts'ai Lun.

Only a few actual specimens of early writing survive, mostly on wooden slips and fragments of silk, and it was not until the discovery of a great hoard of manuscripts by Sir Aurel Stein on the north-west frontier of China that abundant material dating from the beginning of the 5th to the end of the 10th century became available. The British Museum acquired a large part of the collection, comprising several thousands of paper rolls and a few hundred booklets, besides a quantity of single sheets and smaller fragments. The writing, as is the rule in Chinese books, runs in columns read from top to bottom and proceeding from right to left. Only of late years has the western style of writing in lines from left to right been occasionally adopted. Either way is equally suited to the compact Chinese characters. Where any punctuation at all occurs, it consists only of a flick of the brush to indicate a pause, and more rarely, a small circle to serve as a full stop. Even these marks seem in most cases to have been inserted by the reader. Two well-marked changes are noticeable in this long series of manuscripts. In the earlier rolls the characters, though easily legible, are somewhat heavily drawn and archaic in appearance. Then the style improves, and in the best manuscripts of the 6th century, which are generally Buddhist sūtras, all trace of clumsiness vanishes, and the handwriting becomes *k'ai shu* at its very best. But again, after the rebellion of An Lu-shan in the 8th century, that disastrous set-back to T'ang civilization, there is a sudden and striking change for the worse, which may be due to local conditions under



which the scribes were insufficiently educated and trained in penmanship. By the 10th century manuscripts of even passable quality are quite the exception.

### *Printing*

During the T'ang dynasty, the new invention of block-printing was beginning to make headway, and in course of time the occupation of the copyist dwindled away as it did five or six hundred years later in Europe. Several Buddhist charms in Chinese characters that were printed by order of a Japanese empress in 770 are still in existence. And the Stein Collection contains a printed copy of the Diamond Sūtra, in a roll 17 feet long, which is dated 868, with a finely engraved frontispiece, showing that the art had then reached a high pitch of perfection. Towards the middle of the next century, the name of the first known printer, Lei Yen-mei, appears at the end of an imperfect copy of the same text. A number of beautifully printed books modelled on the *k'ai shu* style of handwriting have come down to us from the Sung dynasty; and it was in the same period, between the years 1041 and 1048, that a humble craftsman named Pi Shêng first succeeded in printing from movable types made of baked clay, each bearing a complete Chinese character on its face. Types were afterwards made of wood and metal, but in those early days typography proved less suitable for Chinese than printing from blocks. Several important works, however, were produced from time to time by this method, notably the great encyclopædia of 1726, and it has now become almost universal. Our experts have been curiously loth to concede the Chinese claim to have invented movable types, and are rather inclined to give the whole credit to Gutenberg. One of them even argues that 'his problem was one of which Pi Shêng was not even cognizant—namely that of reproducing Western alphabetic script by mechanical means for the purposes of the general reader in Europe—a problem quite different from and much more complicated than that which faced the Chinese craftsman'. This merely amounts to saying that Chinese is a different kind of script from ours, a fact which no one wishes to deny. The truth is, of course, that the problem was in essence the same, the main difference being that each of Pi Shêng's types had to carry a character of far more complicated structure, in most cases, than a single letter of

the alphabet, and that the number of different types ran into thousands instead of being limited to 26, with a few more added for punctuation.

### *Lexicography*

It was early in the Han dynasty that Chinese scholars began to give serious attention to the study of their written language. The first attempt at lexicography that has been preserved is the *Êrh Ya*, which contains explanations of classical terms grouped under 19 categories. Not being well adapted for easy reference, this type of dictionary eventually made way for what may be called the graphic dictionary, in which characters are arranged according to their radicals. The oldest work of this class is the *Shuo Wên Chieh Tzû*, produced by Hsü Shên in A.D. 121, and of such outstanding merit that it has formed the basis of etymological research ever since. It is a collection, with short explanatory notes, of all the characters—some 10,500—which the author could find in Chinese literature as then existing, written in the Small Seal with the corresponding forms in the Han script. The characters are distributed under no fewer than 540 radicals—an unnecessarily large number, as it seems to us. And the difficulty of consultation is increased by the haphazard arrangement of the characters under each radical. Yet, in spite of these drawbacks, the scheme of the *Shuo Wên* is actually more scientific than that of its successors. The fact of a character coming under a certain radical in the standard dictionary of K'ang Hsi is not always proof that it is by derivation connected with that radical. In this respect, the *Shuo Wên* is by far the better authority. In general it may be said that, while the definitions in the *Shuo Wên* are often unsatisfactory, the derivations and ancient forms are invaluable\*.

A point to be noted is that Hsü Shên, while giving the meaning of characters in his dictionary, was unable to provide any indication of their sound. This defect was remedied to some extent by a spelling system known as 反切 *fan ch'ieh* which was introduced by Buddhist missionaries from India in the 3rd century. In order to express the sound and tone of a given character, they divided two other Chinese monosyllables into initials and finals and combined

\* A useful key to the *Shuo Wên* will be found in: Chalmers, J, 'Chinese Etymology', *China Review*, vol. v, pp. 304 10 (Hong Kong, 1876).

the initial of one with the final of the other, which had to be in the required tone. Thus, the sound of the character 帶 *tai*<sup>4</sup> can be rendered by taking the initial of, say, 當 *tang* together with the final of 蓋 *kai*<sup>4</sup> (*t* + *ai*); or that of the character 終 *chung*<sup>1</sup>, in like manner, from 計 *chi* and 東 *tung*<sup>1</sup> (*ch* + *ung*). It has to be assumed, of course, that the sound of those other characters is already known. In all subsequent graphic dictionaries, including later editions of the *Shuo Wên*, this simple guide to the pronunciation was adopted.

The number of radicals which the first lexicographers thought necessary was found to be unwieldy and was gradually cut down until the 214 now in use were selected during the Ming dynasty and given a final stamp of authority by the great *K'ang Hsi Tzû Tien*, completed in 1716. Though the selection, as we have seen, was in some respects arbitrary and unscientific, it has so far held its own against all attempts to improve upon it. These radicals are arranged according to a fixed order based on the number of their strokes, from one to seventeen. About thirty of them occur with great frequency: for example, nos. 9 (man), 30 (mouth), 32 (earth), 38 (woman), 46 (mountain), 61 (heart), 64 (hand), 75 (tree), 85 (water), 86 (fire), 118 (bamboo), 120 (silk), 140 (grass), 149 (words), 167 (metal). But many of the others might well be expunged from the list and treated as mere primitives or as compound characters with simpler radicals of their own. The derivatives of each radical are also arranged according to the number of strokes. Even so, this often leaves quite a lot of characters to be looked through when any particular one is required, whereas in our alphabetical dictionaries the place of every word is absolutely fixed. Another first-class Chinese dictionary arranged under radicals is the *Tz'ü Yüan* which was published in 1915. Each character is illustrated by a list of phrases consisting of two to six characters, all clearly and carefully explained. Most foreign dictionaries of Chinese, such as those of Couvreur and Giles, follow the alphabetical order of the syllables for the body of the work, and supply a radical index at the end. Soothill's pocket dictionary is useful in that it first gives some 4,300 characters in 178 main groups, each containing a number of nearly allied phonetics in subsidiary groups. Then the same characters are repeated in alphabetical order, together with twice as many other characters that occur more rarely, and a radical index to the whole.

If one wishes to find any particular character in one of these dictionaries, the first thing is to decide whether it is a radical or a compound. If the former, it will be found in its place, according to the number of strokes, in the index. Thus, 大 has three strokes, and it is radical No. 37. If it is a compound character, it is first of all necessary to discover the radical, which in most cases will not be difficult. Let us suppose that the character we require is 楊. The radical is the portion on the left, 木 'tree', with four strokes, which is No. 75 in the series. The remaining portion is the phonetic 易, which consists of nine strokes. There may be some 40 characters with the radical 木 and a phonetic of nine strokes, and these will have to be looked through. The index then refers you to a serial number (as in Giles' dictionary) or to a page (as in Couvreur) in the body of the work, and there you find the character, pronounced *yang* and meaning a willow. Some of the radicals may be written in a contracted form when in combination: 心 becomes 忄 (as in 悟); 手 becomes 扌 (as in 打); 水 becomes 氵 (as in 江); 火 becomes 灬 (as in 烈); 邑 becomes 阝 (as in 都); 阜 also becomes 阝, but is placed on the left (as in 防). And there are a few others. But apart from this, the radical in some characters may not be easy to pick out. A special list of such characters is therefore usually provided, arranged according to the total number of strokes, with their radicals indicated. With certain exceptions, strokes are written from top to bottom and from left to right; what might appear to be two strokes is sometimes really a single stroke as executed with the brush. 日, for instance, which forms part of the phonetic 易, consists not of five strokes but of four, because the enclosing portion 冂 counts only as one. 弓 seems to be composed of six strokes, but in reality it has three: 丿, 一, ㄣ. Most of the different strokes are exemplified in the character 永 'eternal', which for dictionary purposes contains five strokes, though calligraphists distinguish as many as eight.

The radical system is on the whole the best that has yet been devised for the classification of Chinese characters, and the student must learn at least the commoner radicals and their place in the series before he can consult a Chinese dictionary with ease. It has often been debated whether it is really necessary for him to know all the radicals in their order, seeing that so many are of little importance in themselves and have so few derivatives. The answer seems

to be that though it is not absolutely necessary, it will be advantageous to do so in the long run. Where there are so many characters to be learned, the extra tax on his memory will be negligible, especially if he uses a mnemonic such as the Rev. J. Silsby's 'Radical Ode'. This is an amusing set of nonsense verses in which the meanings of all the 214 radicals are given in their proper order. Here is an extract dealing with radicals of three strokes, Nos. 30 to 48 (italicized in the text);

"Three smacks on the *mouth*—an *enclosure* so sweet  
That *earth's* greatest *sage* follows slowly to greet.  
This *evening*, *great lady*, your *son* had a fall  
From a *roof* that was *forty-one inches* too *small*.  
He is *lame*, not a *corpse*, and some *sprouts* from the *hill*,  
Washed in *streams* by the *workmen*, will keep him quite still."

'Inch', it should be noted, is radical No. 41.

Besides the two kinds of dictionary already discussed, there is yet a third, which is arranged according to rhymes taken from the classical Book of Songs. At first about 200 rhymes were used, under which all the characters in the language were distributed, regardless of the fact that many words which once rhymed to the ear did so no longer. It is as though 'sote', Chaucer's form of our word 'sweet' which he rhymed with 'root', were made to rhyme with 'meet'. An early work of this class is the *Ch'ieh Yün*, which in course of time was expanded to include as many as 28,000 characters. But the greatest of all phonetic dictionaries was the *Yung Lo Ta Tien*, compiled at the beginning of the 15th century, which was divided under four tone-groups, and again under 80 rhymes. The characters were treated singly and in combination with others, each phrase being illustrated by extracts from the literature of the past. So stupendous was the scale of the work that whole treatises were frequently transcribed, and the total number of sections (*chüan*) amounted to 22,877, exclusive of a table of contents in 60 sections. The *Yung Lo Ta Tien* was never printed, and now only a few hundred volumes remain out of the original 11,095. By far the most important of the phonetic dictionaries still in existence is the enormous compilation entitled *P'ei Wên Yün Fu*, prepared by a commission of scholars by order of the Emperor K'ang Hsi in 1704. Originally designed as a sort of *Gradus ad Parnassum*, it was so enlarged that it can almost be regarded as a concordance to the

whole of Chinese literature, classical, historical, poetical, and philosophical. Fiction and the drama were excluded because they did not then count as literature at all. Phrases of 2, 3, or 4 characters are arranged in it under five tones and 106 rhymes, and each phrase, placed under the rhyme of its last character, is followed by quotations from a great variety of sources. It is easy to consult provided one has a dictionary in which the key-rhyme of every word is indicated.

### *Characters in combination*

So far, we have been considering Chinese characters as independent units. It remains to say something about their influence on one another when combined into a sentence. Is it possible to apply to them anything in the nature of our grammatical laws? Inasmuch as no character bears within itself any indication of gender, number, case, person, voice, tense, or mood, it is obvious that grammar in the commonly accepted sense cannot exist for Chinese. And it is significant that the Chinese themselves, though zealous students of their own language, have never formulated any set of rules governing the mutual relation of words. The furthest they have gone is to draw a distinction between 'full' and 'empty' words, the former being subdivided into 'living' words (verbs) and 'dead' words (noun substantives). Empty words are particles of various kinds. But even this distinction cannot be rigidly maintained, for what is a living word in one place may be a dead word in another. In fact, as Marshman pointed out over a century ago, 'a Chinese character may in general be considered as conveying an idea without reference to any part of speech'. 上, for instance, conveys the idea of being *above* something else; it is a preposition when we write 山上 'on the mountain'; a noun when used alone to denote the 'Upper One' or Emperor; an adjective in 上帝 'the Supreme Emperor', or God; a verb in 上馬 'to mount a horse'; and even an adverb in 上好 'very good'. Chinese, indeed, is not to be forced into our grammatical moulds; yet attempts are constantly being made by misguided pedants to create an elaborate system of grammar for a people who have never felt any need for it. On the other hand, eminent teachers of Chinese have spoken strongly in the opposite sense: 'Lisez, lisez, lisez,' Professor Schlegel once said to his pupils; 'jetez vos grammaires au feu'. It is certain

that beginners would do well to banish the conception of grammar from their minds, so far as possible, when reading Chinese, as it may prove a real hindrance to their gaining insight into the genius of the language. More helpful would be some attempt to study the position of characters in the sentence, but even here it is dangerous to be bound by hard-and-fast rules. Generally speaking, it will be found that words follow the logical order, very much as they do in English, and not as in Latin or German, where the verb is often relegated to the end of a sentence.

It would be impossible in a sketch like the present to go deeply into the principles of Chinese composition, but a few outstanding features may be noted. From the beginning, literary diction has always tended towards conciseness, as we may see in any of the early classics, where all redundancies are ruthlessly shorn away. Take this sentence from the Confucian Analects, in which the characters are represented, though inadequately, by a literal English translation: 'Can with together learn, not-yet can with go-to Way'. In order to bring out the meaning clearly, we should have to use about twice the number of words in English: 'Let a pupil join with you in self-cultivation before you let him approach the general truths of philosophy'. The same applies even to the simple poetry of the Book of Songs, though here we do get a greater profusion of those final or merely euphonic particles which defy translation: 'Respect *chih* respect *chih*; Heaven [*copula*] manifest *ssü*, appointment not easy *tsai*.' Legge translates: 'Let me be reverent, let me be reverent (in attending to my duties); the Way of Heaven is evident, and its appointment is not easily preserved.' The style of both these passages is far removed from common speech.

The use of word-pairs was one of the means devised in order that speakers might be understood. The syllables *huan* and *hsi*, for instance, both mean 'glad', and the combination *huan hsi* is used in speaking because either syllable used singly can have many other meanings, from which ambiguity would result. But this reduplication or coupling of synonymous terms was considered unnecessary in the book-language, where every individual character means something definite to the eye, though nothing to the ear. From this follows the singular fact that what is written in books cannot be properly understood by the hearer if read aloud. The only way is

to render the sentences into colloquial form as one goes along. This is certainly a serious disadvantage, but it is partly counter-balanced by the fact that characters are totally unaffected by any change in pronunciation that may have occurred since they were first constructed, and therefore tend to grow obsolete much less rapidly than our words. The whole of Chinese literature, covering 2,500 years or more, is couched in practically the same medium, and can be regarded as a permanent national possession, whereas we find difficulty in reading books that are only a few centuries old, because they are written in what to us is already a strange language. The 'immortality' we proudly attribute to our great writers is thus achieved in a more real sense by the Chinese, who can say with much greater truth, 'Litera scripta manet.'

### *Peculiarities of Chinese composition*

Though the literary prose style had already begun to take shape three or four centuries before our era, especially in the brilliant Taoist compilations of Lieh Tzŭ and Chuang Tzŭ, it did not reach its perfected form until a thousand years later. One of its salient features is the so-called law of parallelism; that is to say, sentences tend to run in pairs of the same length, the words in the one balancing the corresponding words in the other. An example will make this clear :—

Quiet<sup>1</sup> sit<sup>2</sup> constant<sup>3</sup> think<sup>4</sup> self<sup>5</sup> fault<sup>6</sup> ;  
Leisure<sup>1</sup> talk<sup>2</sup>.do-not<sup>3</sup> discuss<sup>4</sup> man<sup>5</sup> wrong<sup>6</sup>.

Or in more idiomatic English : ' Sitting alone, meditate on your own faults ; in conversation, talk not of other men's '.

Such is the usual form taken by Chinese proverbs, and it is also much affected in all sorts of elegant compositions. It need hardly be said that the parallelism is not always so strictly observed as in the above, but the rhythm of sentences, and even more that of verses, is generally influenced by it in some degree. Here is an ode to a firefly by the poet Li Po, which is typical of many :

Rain<sup>1</sup> beat<sup>2</sup> lantern<sup>3</sup> hard<sup>4</sup> extinguish<sup>5</sup>,  
Wind<sup>1</sup> blow<sup>2</sup> colour<sup>3</sup> more<sup>4</sup> bright<sup>5</sup> ;  
If<sup>6</sup> fly<sup>7</sup> heaven<sup>8</sup> above<sup>9</sup> go<sup>10</sup>,  
Certainly<sup>6</sup> make<sup>7</sup> moon<sup>8</sup> side<sup>9</sup> star<sup>10</sup>.



And this is Prof. H. A. Giles' rhymed version :

“ Rain cannot quench thy lantern's light ;  
 Wind makes it shine more brightly bright ;  
 Oh, why not fly to heaven afar,  
 And twinkle near the moon—a star ? ”

The style employed in novels approximates more closely to the spoken language, but there is considerable variation in this respect. In the famous Romance of the Three Kingdoms (*San Kuo Chih Yen I*) the diction, though plain and simple, is much more ' literary ' in character than in such books as the *Shui Hu Chuan*, which is a tale of the common people and aims at reproducing their mode of speech. This is full of words such as 甚麼 (pronounced *shummo*) for ' what ? ' ; 的 *ti* used as the sign of the genitive instead of 之 *chih*, or as a collective particle in place of 者 *chě* ; 這 *ché*, ' this ' for 此 *ts'ü* ; and 道 *tao*, ' to say,' instead of 曰 *yüeh*, all of which are definitely banned in the book-language of historians, essayists, and poets. The colloquial or semi-colloquial *pai hua* (plain speech), as it is called, was considered too vulgar for the use of writers until a quarter of a century ago, when a radical reform was set in motion aiming at nothing less than the total abolition of the old style of writing. For a time it looked as if this new movement would carry all before it, but the pendulum soon began to swing back again. It was recognized that the *pai hua* has many limitations. It has the virtue of simplicity, but lacks elegance and terseness. Though it may be the natural medium for popular novels and other light literature, it is much less suited for the shades and subtleties of poetical expression. And so a compromise is likely to be reached : the literature of the future will no doubt be simplified, the structure of sentences will be freer, and less attention will be paid to the correct balance of words. But the Chinese written language is never likely to discard entirely those qualities which have made it such a supple instrument for the expression of human thought and emotion. Even modern Chinese journalism has preserved a style which cannot by any means be described as conversational. If the *pai hua* has failed to conquer this domain, much less can it hope to triumph in poetry and the higher flights of prose composition, where so much depends on concise utterance and balanced rhythm. Moreover, there is a vast store of words which are never heard, and

indeed would not be understood, in ordinary talk. Those who so cheerfully advocate the scrapping of literary Chinese must be prepared to sacrifice much of the richness and variety of a language which has been gradually built up for thousands of years.

### *Proposed substitutes for Chinese characters*

The extreme reformers, however, would like to go further still and do away with the characters altogether, either by means of romanization or some form of phonetic script akin to Pitman's shorthand. The well-established Wade system of orthography, which is used in this chapter, aims only at a reasonably accurate transcription of the sounds, and does not claim to produce vocables which can be turned back at sight into the characters they represent. It renders the Pekingese sounds by syllables in which the consonants are mainly the same as in English, and the vowels as in Italian. Aspirates are retained, and the four tones indicated by figures affixed to the words, e.g. *chang*<sup>1</sup>, *li*<sup>3</sup>, etc. Other European countries have different systems of transliteration to suit their different languages. In the new official script (Gwoyeu Romatzyh) sponsored by the Chinese Minister of Education, aspirates and tones are indicated not by auxiliary signs but by slight variations in the spelling. Thus, *ting* appears as *ding*, *dyng*, *diing*, or *dinq*, according to the tone, and *t'ing* as *ting*, *tyng*, *tiing*, or *tinq*; *yü* as *iu*, *yu*, *yeu*, or *yuh*; and so on. This of course still leaves one as helpless as ever when it comes to identifying the character through the transliterated form alone. *Yu*, for instance (Wade *yü*<sup>2</sup>), and *yuh* (Wade *yü*<sup>4</sup>) can each mean at least fifty different things. The same objection applies to the phonetic script which was hailed with exaggerated enthusiasm some twenty years ago. This is based on the same principle as *fan ch'ieh*, being composed of simple signs representing initials and finals which in combination indicate the sound of a whole word. In this way it was found possible to express all the 420 syllables of the Pekingese dialect by means of 40 signs altogether. Except that it may be more adapted for native use, this phonetic system is really no improvement on ordinary romanization. It may serve to convey the meaning of simple, conversational Chinese, but the book-language is utterly beyond its scope (see p. 457 and Appendix III).

A more determined effort to grapple with the problem has recently been made in the ingenious system devised by C. C. Wang for the special purpose of telegraphing Chinese words instead of using a code. It is rather too complicated to be set forth in detail, but its main features are : (1) the transliteration more or less as in the Wade system ; (2) the addition of the letters *c*, *q*, *v*, or *x*, to distinguish the four tones ; (3) the further addition of one or two other letters to represent one of the chosen radicals (reduced in number to 95). According to this system, 房 ' house ' would be written *fangqm* where *fang* stands for the simple sound, *q* for the second tone, and *mn* for the radical 門, which has been amalgamated with 門 *mén*, both meaning ' door '. Though the resultant syllables look a little uncouth, the introduction of the radical into the transliterated form is a notable step forward, for words with the same sound, the same tone, *and* the same radical are comparatively few in number. The system is still in process of development, and Wang claims that it is already suitable for typewriting as well as for telegraphy. But that it will ever be adopted universally in place of the existing characters is but an idle dream.

*How can Chinese writing be kept up to date ?*

If the characters, then, are to remain, will they be able to give adequate expression to the multitude of new ideas that are constantly springing up ? Within the last fifty years, especially, almost every branch of human knowledge has made rapid progress, and new terms of every description have been added to the European languages. How are they to be transferred to Chinese ? Must an equal number of entirely new characters be created ? Theoretically the formation of new characters in any number is of course feasible. One has only to trace a few strokes, and then postulate that certain combinations shall mean certain things. But if this process were carried on indefinitely, the strain of memorizing such characters would be too great for the average brain. Moreover, being etymologically unrelated to the body of characters now existing, they could hardly be regarded as Chinese at all. A better plan, at first sight, would seem to be to construct new characters out of others already in use, each contributing something to the significance of the whole. If such an attempt were made, however, it would encounter precisely the same difficulties that long ago put a stop to the

multiplication of ideograms. In most cases, the component parts could only give a very vague clue to the meaning, and the greater the number of elements introduced the more unwieldy and forbidding the characters would become. Consequently, the Chinese have made little or no use of this method. They prefer to render scientific and other terms hitherto foreign to the language by groups of separate, suitably chosen characters. Thus, bacteriology is 細菌學 'minute-fungus-learning'; hypnotism, 催眠術 'induce-sleep-art'; psycho-analysis, 精神分析 'spirit-mind-divide-split'; a barometer, 風雨表 'wind-rain-indicator'; a torpedo, 魚雷 'fish-thunder'; and so on. Put thus into English, these compounds may appear somewhat clumsy, not to say grotesque; but in Chinese they read much more naturally. At any rate, no better alternative has yet suggested itself for the importation of alien conceptions into this stubborn but wholly fascinating language.

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## Chapter XV

# THE NATIONAL LANGUAGE AND THE DIALECTS

Origins of the National Language : The Progress of Linguistic Reform : Gwoyeu Romatzyh : The National Language as *lingua franca* : The non-Mandarin Dialects : Bibliographical Note.

### ORIGINS OF THE NATIONAL LANGUAGE

The 'National Language' (*Kuo Yü*) is closely linked with the 'Reform Movement' of modern China. This movement, from the very fact that it demanded acquaintance with Western ideas, was bound to have a linguistic aspect. Previously, the difficult literary language had been the only style used in any kind of book that was not either a novel or a drama. If this language had to be used in books and papers on Western ideas and institutions, only a very small percentage of the population would have been able to understand it, quite apart from the difficulties presented by the subjects themselves.\*

Small wonder, then, that the cry 'Write in colloquial language so that the people can read you' grew louder and louder. Two terms were used to denote the colloquial language and to contrast it with the literary style—*pai hua*, i.e. 'plain language', and *kuan hua*, i.e. 'language of the officials'. Whereas the term 'plain language' does not need any further explanation—though much might be said on the history† of the *pai hua* itself—the second expression must be further elucidated; '*kuan hua*' was the language spoken by the imperial officials who, posted to the different provinces of the Chinese Empire, spoke, at least approximately, the language of the capital (Peking) when performing their official duties. The term has a Western counterpart in *Mandarin*, which seems even to be an attempt at translating it, since it goes back to the Sanskrit word for 'minister', *mantrin*.

\* See footnote on p. 430, and pp. 450-3.

† Its history was written by the man who was the foremost advocate, and to a large extent the creator, of the 'Literary Renaissance Movement', Dr Hu Shih, until recently Chinese Ambassador to the United States. An open letter from him, published in 1916 in the journal *Hsin Ch'ing Nien* ('Youth'), is said to have given birth to the 'literary Revolution'.

It is very characteristic of this linguistic reform movement that, in addition to *kuan hua* and *pai hua*, a third term should have been introduced, and eventually have prevailed over both. As early as 1910 a memorandum was sent to the Chinese Minister of Education urging the rejection of the term *kuan hua* because it implied that the colloquial language was important only for officials and not for people in other walks of life. It suggested, therefore, that the term *kuan hua* should be replaced by the term *Kuo Yü* or 'National Language'.

This obviously was a happy suggestion, for the term was a slogan in itself. So long as the reformers had to limit themselves to an appeal in favour of the plain language on behalf of the less well educated classes, the Chinese intelligentsia could afford to keep aloof, pretending that they were not interested in the education of the masses. But no Chinese, however learned he was, could refuse to work for the 'National Language'. For, if it were possible to create a 'National Language' as a *lingua franca* for the whole of China, then something would be achieved that could never be anticipated from the all-powerful Chinese script. By means of the characters, people all over the Empire had hitherto been able to *read* Chinese because the *meaning* of each character was clear, no matter how it was pronounced (in the same way as our Roman figures can be understood in their mathematical value, no matter whether we read them *one, two, three* or *un, deux, trois*, or *eins, zwei, drei*). The term *Kuo Yü* now went further, and conjured up before Chinese minds the idea of an *oral* understanding over the whole vast area of China.

It must be added that Dr Hu Shih used a further powerful argument in favour of the 'National Language'. He rejected the literary style not—or not merely—because it was difficult to understand, but because it was 'a dead language'. People who wrote this language, he argued, were like Westerners who wrote Latin instead of their mother-tongue.

#### THE PROGRESS OF LINGUISTIC REFORM

In 1913, three years after the sending of the Memorandum, the first 'Congress for the Unification of the Pronunciation' was summoned. This congress was attended by 79 members, including two representatives from each province, and one from both Tibet and Mongolia. The Chinese overseas were also represented.

The first achievement of the Congress was the approval of what are now called 'Phonetic Symbols' or 'The First Pattern of the National Alphabet'; and the term 'Phonetic Alphabet' was adopted. It was an alphabet of 39 symbols (24 initials, 3 medials, 11 finals and a symbol for the so-called diminutive suffix); later on another final was added. Two points are remarkable in this alphabet. The first is that the symbols are so simple that they can easily be recognized and easily drawn even by unskilled hands. The second is that the symbols are entirely Chinese. Nothing would have been more detrimental to the 'National Language Movement' than to have begun by combining it with a campaign for writing Chinese in Latin script. Such a campaign might well have jeopardized the whole movement. Moreover, the phonetic alphabet was not exclusively, or even primarily, devised to supplant the Chinese characters. With suitable reduction of their size, these symbols can be printed by the right side or at the top of the Chinese characters to indicate their pronunciation, thus facilitating the reading of Chinese texts. Japan had for many centuries preceded China in this method of indicating the reading of Chinese characters by printing the syllabic (Kana) script by their side (*furigana*).

The phonetic alphabet, we must realize, enabled Chinese scholars to indicate a *standard pronunciation of Chinese*, and the working out of this standard pronunciation must be recorded as the second and no less great achievement of this Congress. The recommendations of the Congress were limited, at first, to the 7,200 most current words. Increased (by the addition of homonyms to approximately 13,700 words), they were then embodied in a *Dictionary of National Pronunciation* which was first published six years later (1919) and has since been reprinted several hundred times.

The pronunciation decided upon in 1913 was a compromise between the pronunciation prevailing in Peking and that of the dialects of the southern provinces, whose support of the movement was important. Just as the adoption of the Latin script would have imperilled the National Language Movement, so the wholesale adoption of the Pekingese dialect might have killed the efforts towards a unified standard pronunciation.

#### GWOYEU ROMATZYH

But events have moved to a further stage. Two developments have occurred: (1) The pronunciation of the National Language is now,

thirty years later, practically identical with the pronunciation prevailing in Peking. (2) By the side of the forty symbols of the 'First Pattern of the National Alphabet', we now find the Roman letters of its 'Second Pattern' (*Gwoin-tzyhmuu Dihell Shyh*) in Chinese dictionaries and encyclopædias. This 'Second Pattern' is called 'The National Language Latin Script' (*Gwoyeu Romatzyh*); and it was officially recognized as such by the Chinese Ministry of Education in 1928.

As will be seen from the Rules and Tables included in Appendix III (see pp. 477-86), the main feature of this script is that *it incorporates the Chinese tones in the orthography of the words.*

It is difficult to forecast the role which G(woyeu) R(omatzyh) may eventually play in China. Its adoption would enormously simplify reading and writing, and would so be an invaluable contribution to mass education. From a purely linguistic point of view it may even be argued that G. R. permits of a more adequate representation of the present stage of the Chinese language than the character script. The latter fitted perfectly the old classical language where single words were the rule and compounds the exception. The outstanding feature of modern Chinese is, however, its abundance in compounds; and, whereas the character script does not give any indication as to which two, three, or more Chinese characters belong together and form a compound, G. R. will write such compounds in one word and, in this way, ease considerably the task of reading modern texts.

On the other hand, only colloquial texts are intelligible when written in G. R., so that to do away with the characters would mean that the whole of the Chinese classical literature would be inaccessible unless it were recast into colloquial style.

If, then, the adoption of the Latin script would confront China with very difficult problems, the solution of which must be entirely left to the Chinese, one thing at any rate is clear. The Latin script has proved very useful for the teaching and learning of Chinese in the West. That students who know G. R. are almost immune against mistakes in the tones goes without saying, nor need the value of writing compounds in one word be stressed again. The greatest benefit which students derive from the reading of G. R. texts is a growing ability in understanding spoken Chinese. The paucity of sound groups, 400 syllables only, partly varied by tones (as is evident from the Tables, pp. 477-82), and the abundance in homonyms resulting therefrom, confront the Western student with



greater difficulties in understanding than in speaking Chinese. This aspect of the language, then, calls for special training ; and, whereas reading of Chinese texts in the character script would be of no avail because it differentiates by the script what sounds alike, G. R. texts present the student with exactly the same difficulties as he experiences in listening, because complete or approximate homonyms have identical or similar spellings.

### THE NATIONAL LANGUAGE AS A *lingua franca*

The importance of the National Language as a *lingua franca* has already been stressed on p. 455. With the continuous expansion of education in China, the knowledge of the National Language is steadily spreading. This development, moreover, has been accelerated by the present war emergency which has involved considerable migration to the West, and which has brought into close contact people who normally live thousands of miles apart.

But quite independent of the war emergency and of the efforts made by educationalists, the National Language, while being more or less identical with the Pekingese dialect, must be considered the key language for all the 'Mandarin dialects' ; the differences between these dialects are so small that mutual understanding between speakers of any two of the dialects is possible.

The 'Mandarin dialects' consist of three groups, northern, southern and south-western. The northern group covers the Hwang ho basin and the whole of Manchuria ; the Pekingese dialect is its main representative. The southern group covers a much smaller area between Hankow and Nanking, and the Nanking dialect may be taken as representative. The third group is south-western Mandarin. It covers the provinces of Szechwan, Yunnan and Kweichow, and extends eastward as far as Wuchang and Hankow ; the dialect of Chêngtu may be taken as representative.

The area covered by these dialects, then, reaches from Manchuria in the north to Szechwan in the west, and covers roughly northern and most of Central China (Fig. 122). Within this huge area, to quote the most competent Chinese authority, 'the three groups of Mandarin dialects may be regarded as one language like the language of all English speaking people of the world.'\*

\* Chao Yuen Ren, 'Language and Dialects in China', *Geographical Journal*, vol. cii, pp. 63-6 (London, 1943).

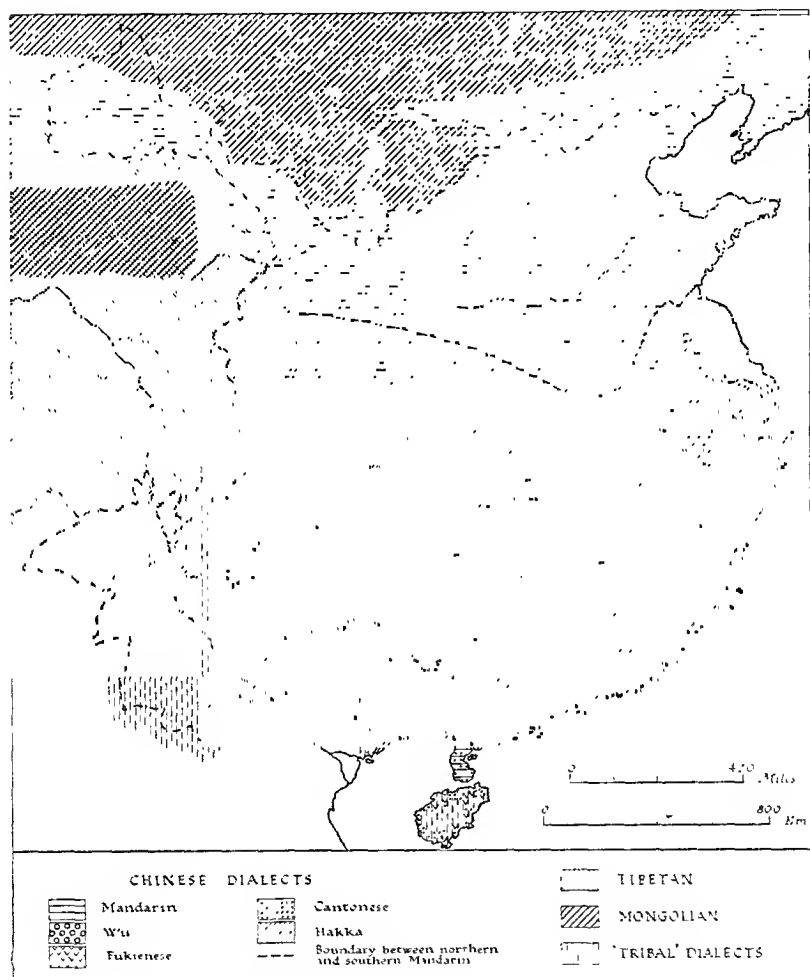


Fig. 122. Distribution of languages

Based on (i) *New Atlas of China*, plate 5 (Shanghai, 1934); (ii) Cressey, G. B., *China's Geographic Foundations*, p. 11 (New York, 1934); and (iii) Maspero, Georges, *Un Empire Colonial français : l'Indochine*, vol. i, map (Paris, 1929).

## THE NON-MANDARIN DIALECTS

Outside the area of Mandarin dialects the following main groups can be distinguished :

(i) Cantonese group ; (ii) Hakka group ; (iii) Amoy-Swatow group and (iv) Foochow group, together comprising the Fukienese group ; (v) Wu group.

Of these the first three are of special importance because all overseas Chinese speak one or other of them. The Amoy dialect (Hokkien), Cantonese and Hakka are all spoken in Malaysia and the Southern Seas. Hakka and Cantonese are spoken in the Hawaiian islands, while Cantonese is the predominant speech of the Chinese residents in America (see pp. 115, 122, 418).

The non-Mandarin dialects show great discrepancies. But for the link of the common Chinese (character) script, they would certainly have been classified as separate languages. To illustrate this point the appended chart of Chinese numerals is contrasted with a chart of the numerals in Romance languages. For the same reason that Latin is included in the chart of the Romance languages, the supposed vernacular language of China about A.D. 600 (T'ang dynasty)—as reconstructed by Professor B. Karlgren—is included in the Chinese chart.

It may be noted that in addition to the old finals *p*, *t*, *k*, the final *m* also is kept in Cantonese, Hakka and Amoy. The Shanghai dialect is remarkable for keeping the old voiced plosives and affricates. The numerals for 'seven' and 'nine' illustrate the differentiation of old guttural and dental plosives or affricates and their palatization in the 'National Language'. There are many other differences, but these few points must suffice to illustrate the diversity of the Chinese dialects.

*Chinese Numerals*

	one	two	three	four	five	six	seven	eight	nine	ten	hundred
<i>Kuo Yü</i> (G.R.)	i	ell	san	syh	wuu	liow	chi	ba	jeou	shyr	bae
<i>Kuo Yü</i> (Wade)	i¹	êrh⁴	san¹	ssü⁴	wu³	liu⁴	ch'í¹	pa¹	chiu³	shih²	pai³
Cantonese ..	yat⁴	i₃	saam¹	sz³	ng₃	luk₄	ts'at⁴	paat₃	kau²	shap₄	paak₃
Hakka	yit	nyi	sam	sì	ng	luk	tshit	pat	kiú	ship	pak
Amoy ..	chit <sup>(u)</sup>	j¹ <sub>(hng)</sub>	sa <sup>a</sup>	sì	gō	lāk	chhit	poeh	káu	cháp	pah
Shanghai ..	ih	nyi⁰	san	s <sup>o</sup>	ng	lok	tshih	pah	'kyeu	zeh	pak
Ancient Chinese	'jēt	nzi²	csām	si²	'nguo	liuk	ts'iet	p'at	'kiəu	ziəp	pək

*Romance Numerals*

	one	two	three	four	five	six	seven	eight	nine	ten	hundred
French ..	un	deux	trois	quatre	cinq	six	sept	huit	neuf	dix	cent
Italian ..	uno	due	tre	quattro	cinque	sei	sette	otto	nove	dieci	cento
Spanish ..	uno	dos	tres	cuatro	cinco	seis	siete	ocho	nueve	diez	ciento
Portuguese ..	um	dois	tres	quatro	cinco	seis	sete	oito	nove	dez	cento
Rumanian ..	una	doe	trei	patru	cinci	şase	şapte	opt	noe	dece	sută
Latin ..	unus	duo	tres	quattuor	quinque	sex	septem	octo	novem	decem	centum

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## Appendix I

### PLACE NAMES

The Problem of Transcription : Transcriptions into English used to the Present Time : Policy in this Handbook : Glossary : Bibliographical Note.

#### THE PROBLEM OF TRANSCRIPTION

It has been explained in Chapter XIV that Chinese is syllabic in structure but has no alphabet. The syllables have tones which sound curious to the English ear and are mastered only by those with a sensitive hearing of the Chinese language. There are in the Peiping dialect about 400 syllables, each of which has four tones. A large number of Chinese characters indicating distinct objects or ideas may have the same sound including the identical tone. 'Ho' with tone 2, i.e. the lower even tone suggesting an interrogation, may mean a river, growing grain, join, harmony, a questioning 'What' ? or it may be a surname. In the written Chinese language each of these objects or ideas has a distinct ideograph, and it will readily be seen that efforts at transcription are about as controversial as attempts to express colour in terms of sound.

As the whole basis of the two languages is different there is no such thing as a perfect transcription. Over and above the fundamental difficulty discussed above there are several others which have been met in various ways by learned transcribers in the past. There are many dialects in China and an ideal transcription would, according to L. Giles, give the pronunciation of each character in all the principal dialects, a dozen or so in number. The problem is particularly acute for names in south-east China where well-established and distinct dialects are in use (Fig. 122). A second difficulty in any transcription is the choice of letters in English or other European languages. English has a considerable variety of sound for the same letters. T. F. Wade solved this problem by choosing consonants as in English and vowels as in Italian.

#### TRANSCRIPTIONS INTO ENGLISH USED TO THE PRESENT TIME

##### *The Wade system and modifications*

The original Wade system of transcription was first published in 1859 and has proved an invaluable basis for all subsequent attempts

at transcription. It includes a number of aspirated consonants, which represent an expulsion of breath between the consonant and vowel. It relies also on tone-figures and other diacritical marks. Some of these were left out by later writers or map compilers, thus achieving simplicity at the expense of accuracy. The Wade system is in the Peiping dialect, and in 1874 Dr Wells Williams devised a system of romanization which proved especially suitable for the provinces using the Wu, the Fukien, Cantonese and other dialects. In 1879 the Wade version, slightly modified, was used by G. M. H. Playfair in his 'Cities and Towns of China'. Playfair added the spellings of Williams for reference. This book set a useful standard of reference for many years. Wade published a final version of his system in 1886.

The Wade transcription had already established its position as an ideal standard but was generally modified in use. In 1892 H. A. Giles used it with amendments in the first edition of his Chinese-English dictionary. This may be termed Wade-Giles I. The Wade-Playfair system continued to hold the field, probably on account of ease of reference. In 1912 the Admiralty stated its acceptance of the Wade-Playfair names. Previous to this, however, the Postal Guide appeared and induced a further modification of the Wade system in the second edition of H. A. Giles' 'Chinese-English Dictionary' published in 1912. This may be termed Wade-Giles II.

### *Conventional forms*

The growth of conventional forms was steady and continuous, partly because it was not held in check by a policy of transcription acceptable to all interested parties. The Postal Guide was first published in 1899, and was followed by the Chinese Postal Map in 1903 and by the Chinese Postal Atlas in 1933. The names in all three follow no standard system but merely give a phonetic rendering of the local dialect. The same principle was followed by the China Inland Mission, who published their first Atlas in 1908. The names in these two atlases cover a considerable proportion of the inhabited places in China, but they include only a small proportion of the natural features. In practice, they include conventional forms and differ only slightly from one another. Both atlases were instrumental in strengthening the hold of conventional forms among map-makers and the writers of textbooks.

*The Permanent Committee on Geographical Names*

In 1899 the Royal Geographical Society adopted the Wade system, as in Playfair, as a basis for transliteration, but decided to follow local pronunciation in the provinces of Fukien, Kwangtung and Kwangsi. This duality proved unsatisfactory and in 1905 the R.G.S. adopted the Wade system for all provinces.

The P.C.G.N. was formed in 1919 and continued the work already begun by the R.G.S. After prolonged discussion P.C.G.N. decided to accept the Postal forms where such existed, on the ground that they had already reached the status of international romanizations. The names of towns and villages with mountains, rivers, and other national features, not mentioned in the Postal Guide, were to be written in Wade's system without diacritical marks. The P.C.G.N. lists contain only a small number of Chinese names but follow the Postal Guide for place names, giving also the Wade transcription. Comparison with the G.S.G.S. map of China, scale 1 : 4,000,000, published 1926, shows that the Postal forms in the P.C.G.N. lists have been used in almost every case. There are only minor divergencies from the China Inland Mission map used as a supplement to the Admiralty *Handbook on China Proper* of 1917-19.

*Admiralty Pilots and Charts*

Most of the Admiralty charts of the early part of the nineteenth century include Chinese characters and one of 1856 has a significant if not highly literary note. 'The Chinese characters of the principal places marked on the chart, if shown to any of the Fishermen, they will know the Port required, for nearly all the people understand the written character of the Empire'. 'Together with the Chinese characters, a translation into English was given with a transcription of the name, apparently on a basis of its sound. The main reliance was placed on the recognition of the Chinese character by some friendly inhabitants who might happen to appear.

From the beginning of European contact with China conventional names on a basis of Chinese names became attached to particular towns and to coastal areas. In addition, sailors named various coastal features themselves, e.g. Saddle islands, Rugged islands, either because they had not been named by the Chinese or because friendly inhabitants were unavoidably absent. Obviously the Chinese



names had a more practical value. With the passage of time the Admiralty has replaced these English names by Chinese names whenever such could be found.

The Admiralty accepted as alternatives all the systems of nomenclature so far mentioned together with the Chinese Admiralty Charts and the Chinese Customs Charts. They had to transcribe various names, especially along coasts, not found elsewhere. In this task they followed the general principle laid down as long ago as 1788 by Sir William Jones who used vowels according to the so-called continental system and consonants as in English. Wade used vowels as in Italian. The reservation on conventional names still remained. The issue of a new Atlas of China in 1936 has made it possible for the Admiralty to adopt various Chinese names not available before, and their Pilot publications are being altered as occasion arises.

### *G.S.G.S.*

The War Office formally adopted the Wade transcription in 1906, and reaffirmed its acceptance of this system in 1912, as modified in Playfair's book. Two important reservations were made. For the province of Kwangtung (but not apparently for other areas in south-east China) they proposed to adopt spellings most nearly approximating to the local dialect and well-known conventional names were to remain unchanged.

In 1943 a new glossary of Chinese topographical terms was published by G.S.G.S. It was prepared by Dr L. Giles under the supervision of G.S.G.S., and derives its main inspiration from Wade: it may be termed Wade-Giles III. Adoption of the system of transcription used in this glossary would introduce many new forms of place names to the readers of this handbook. It is too early to assess the probable influence of this glossary on mapping in the future, but one or two particular difficulties may be noted. Following the original Wade, Wade-Giles III uses a hard 'ch' when followed by 'i' as in 'Chiang' for river. The more familiar form is 'Kiang' in British and American geographical literature and maps. 'Kiang' also appears on Chinese hydrographic charts and the new map of China published by the Jih-Sin Geographical Institute, Shanghai, in 1938. A second Chinese word 'chiang' means, according to Wade-Giles III, a lagoon or anchorage, and it appears on Chinese charts in the form 'Chiang'. The distinction between such estuarine or coastal waters indicated by 'chiang' and rivers indicated by 'kiang' would appear to be useful.

## POLICY IN THIS HANDBOOK

While anxious to keep the fullest possible measure of uniformity and consistency, the prestige of many conventional forms must be recognized. It is not possible at this time to institute a completely new series of place name forms following Wade-Giles III. All problems may ultimately be solved if and when the Chinese Government issues an official transcription. Wade-Giles III might be used, but the power of conventional forms can only be broken by the Chinese themselves. An alternative is Gwoyeu Romatzyh, the new Chinese Latin script recognized by the Chinese Ministry of Education since 1928. This provides a distinct English spelling for the four 'tones' of every one of the 400 syllables in the Peiping dialect. Its adoption would mean the revolutionary alteration of every place name in China.

It is, therefore, proposed to adopt the present practice of the Admiralty as defined above. The names of *coastal* features will be given in transcribed Chinese where such forms are available. To give an example—'Hangchow Wan' will appear on maps but 'Hangchow wan' in the text, following the usual Admiralty practice. Where the place name consists of several component parts, these will be joined as in Huitau Wan in place of Hu i tau wan. It will be noticed that the natural feature is given as a separate word, unlinked by a hyphen with the actual place name. The diacritical marks are not used on the maps but appear if possible in the text. The appended glossary shows the Chinese transcribed form of the various natural features.

For areas *inland* the general standard chosen will be the G.S.G.S. map of China, 1:4,000,000, first edition, 1926, with certain reservations. In the preparation of this map, the War Office were apparently bound by their decision of 1912, accepting the Wade-Playfair system as a general basis with conventional names in certain cases. The use of conventional names will be preserved in this handbook, but where a second form exists it will be given in brackets at least once. It will not be possible to include more than one name on the map. These conventional names have in some cases altered since 1926 following the conspicuous tendency of Chinese cities to change their names. Thus Peking is now Peiping, Yunnanfu is Kunming. Perfection can be achieved only by the inclusion of the Chinese form of the name, but that is impracticable, and a certain amount of discretion must be reserved to the writers of the handbook in their choice of reasonable conventional forms.

## GLOSSARY

The glossary includes some of the more familiar Chinese syllables which occur in place names. The English equivalents given do not represent all the possible meanings of the syllables (see p. 437). Individual place names generally show a simple but clear understanding of the main physical features of the area described, as may be seen in the following provincial names. The separate syllables are distinguished by hyphens in this section.

Ho-nan ..	..	South of the river.
Ho-peh (pei)	..	North of the river.
Hu-peh (pei)	..	North of the lake.
Hu-nan ..	..	South of the lake.
Kiang-si ..	..	River province, west.
Kiang-su ..	..	River of revival (probably fertilizing river).
Kwang-si	..	The broad west, or west Kwang.
Kwang-tung	..	The broad east, or east Kwang.
Kwei-chow	..	The precious district.
Shan-si ..	..	The west mountains, or west of the mountains.
Shen-si ..	..	Mountain passes of the west.
Shan-tung	..	The east mountains, or east of the mountains.
Sze-chwan	..	The four rivers.
Yun-nan ..	..	South of the clouds.

The difficulty of transliteration is apparent in Shansi and Shensi, two adjacent provinces, both of which should be called Shansi or Shanhsi (Wade): the form Shensi is merely a useful convention. The difference shown by the Chinese between the two provinces expresses their main geographical features admirably for both are mountainous, but one has the vital passes leading into the interior of Asia. The emphasis on natural features is seen in many other names, such as Tien shan, the celestial mountains, Ta-pa shan, the great dyke mountains, Tsing-tao, the green island, Po-hai, an arm of the sea, Chang-sha, a long sandbank, Nan-king, south capital.

Transliterated Chinese	Meaning	Transliterated Chinese	Meaning
An	Shore, River bank	Ling	Mountain range
Ao	Bay, Cove, Dock	Lieh-tao	Group of islands
Chang	Long (of time and space)	Liu	Flow, Stream, Current
Chen	Market town	Men	Door, Gate, Pass
Ch'eng	Walled town, City	Min	People (Min)
Ch'i, Hsi	Mountain, Stream	Nan	South
Chiang (Kiang)	Lagoon, Anchorage, Harbour	Pa	Revetted embankment, Dyke, Breakwater
Ch'iao	Bridge, Rocks, Reefs	Pei (Peh)	Embankment, Shore, North
Ching (King)	Capital City, Ford, Ferry	P'o (Po)	Arm of the sea
Chow (Chou)	Department, District	Pu	Plain, Port, Town
Chow	Island	Sha	Sand, Gravel, Sandbank
Chu	Pearl	Shan	Hill, Mountain, Mountain pass, Hilly island
Chung	Middle	Si (Hsi)	West
Chwan (Ch'uan)	Stream	Siang (Hsiang)	Fragrant, Incense
Feng	Peak	Sze	Four, Buddhist temple, Monastery
Fu	Prefecture, Administrative city	Ta	Great
Hai	Sea	Tan (T'an)	Sandbank, Shoal, Rapids
Han	Han dynasty, Chinese	T'ang	Embankment, Pool
Hang	Boat, Ferry	Tao (see Lieh-tao)	Island, Growing rice, Paddy
Ho	River	Tien	Imperial domain, Territory
Hsien	District, District city	T'ien	Heaven, Sky, Celestial, Dry
Hu	Lake	T'ing	Sandpit
Hung	Flood	Tu	Capital, Metropolis
Hwang	Yellow	Tung	East
I	City, District	Tze	Child, Son
Kan	Dry	Wa	Swamp, Hollow
Kiang (Chiang)	River	Wan	Bay
King (Ching)	Capital city	Wei	Cove, Bay, Reeds
Kow	Mouth, Opening, Port, Pass	Yai	Cliff, Pass, Defile
Kung	Palace, Temple	Yang	Raise, Spread
Kwang	Broad	Yen, Yu	Embankment, Dyke
Kwei	Esteemed, Dear, Expensive	Yun	Clouds

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1. For general problems of transcription see Aourousseau, M., 'Suggested Principles for the Use and Spelling of Geographical Names', *Geographical Journal*, vol. c, pp. 177-181, 245-256 (London, 1942).

2. Gwoyeu Romatzyh is discussed in this volume, pp. 456 8 and Appendix III. See also note, 'The Romanization of Chinese Place Names', *Geographical Journal*, vol. cii, pp. 67-71 (London, 1943).

3. See also Spencer, J. E., 'Chinese Place Names and the Appreciation of Geographic Realities', *Geographical Review*, vol. xxxi, pp. 79-94 (New York, 1941).

## Appendix II

### THE GEOLOGICAL EVOLUTION OF CHINA

The Pre-Cambrian period : The Palæozoic period : The Mesozoic period : The Quaternary period.

China has had a very varied physical history. It presents a long sequence of rock groups, which have been laid down under varying physical conditions, and it has passed through many periods of crustal disturbance or mountain-building (orogenic movements or *orogenies*, to use the term now commonly employed to denote particular periods of crustal compression and uplift). Many of these correspond broadly to periods of disturbance in the European area ; others, particularly in Mesozoic times, seem to be peculiar to eastern Asia, or, at any rate, to have no counterpart in Europe. Complex as the physical story is, the same structural theme, with many variations, is often repeated, and the dominant characteristics described in Chapter II frequently recur. Particularly is this true of the marked contrast between China north and south of the Tsinling zone. North and South China have had very different physical histories and present different types of land-forms.

#### *The Pre-Cambrian Period*

First we have a long sequence of pre-Cambrian, i.e. non-fossiliferous rocks, composing the ancient floor of China. The oldest of these constitute an Archæan core of gneisses and granites which still appears at the surface in parts of the ancient massifs of Shantung, Liaotung and eastern Manchuria and enter largely into the composition of the Shansi plateau, the In shan ranges and the Tsinling zone, including its eastern continuation in the region of the Yangtze Gorge mountains. Traces also occur in the South-Eastern Uplands, but in general they are absent from South China.

Then come two great systems of sedimentary rocks known as the *Wutai* (from the Wutai shan in northern Shansi) and the *Sinian* systems, both of which are again mainly developed in northern as distinct from southern China. Although the rocks of the Wutai system can be clearly recognized as having a sedimentary origin, they have been mainly metamorphosed and much invaded by

igneous masses. They consist largely of schists, quartzites and crystalline limestones and are mainly developed in the same regions as the Archæan rocks, frequently overlying them.

*Table of the Main Geological Subdivisions*

Quaternary	Recent Pleistocene	Ice Age
Tertiary	Pliocene Miocene Oligocene Eocene	Alpine-Himalayan movements
Mesozoic or Secondary	Cretaceous Jurassic Triassic	Yenshanian movements
Palæozoic or Primary	Permian Carboniferous Devonian Silurian Ordovician Cambrian	Hercynian (Tungwu) movements  Caledonian movements
Archæan	Pre-Cambrian	

The succeeding Sinian system is a very important one in North China, and the rocks belonging to it are separated by a marked break or unconformity from those of the Wutai series, indicating a great mountain-building movement or 'revolution' which seems to correspond to the well-known 'Laurentide' orogeny in North America. Unlike the rocks of the Wutai series, the sediments of the Sinian are comparatively little altered and take the form of massive limestones and sandstones, laid down in troughs extending from Manchuria into what is now Central China.

One of the many geological differences between North and South China is that in the north, rocks younger than the ancient schists

have not been greatly metamorphosed, whereas in the south young as well as old beds have been invaded by igneous intrusions and widely altered in character.

### *The Palæozoic Period*

With the advent of Cambrian times and the beginning of the long Palæozoic age, the local troughs, in which the Sinian sediments had been laid down, developed into a broad, elongated depression or geosyncline between a folded zone along the continental border—the precursor of the eastern highlands discussed in Chapter II and christened ‘Palæo-Cathaysia’ by geologists—and similar ancient blocks in the west in Tibet and the Gobi region. This ancient sea, as already indicated, occupied the same relative position as the interior lowland belt of modern China and Manchuria but was longer and wider, with some east-west extensions. It lasted through Cambrian and the greater part of Ordovician times, tending to widen and to submerge the adjacent parts of the land-masses, so that the greater part of China was beneath the sea in Middle Ordovician times. Thick masses of limestone were formed in its deeper central portions and more arenaceous deposits in its shallower marginal areas.

Towards the close of Ordovician times, however, a great change occurred. The whole northern portion of this extensive marine trough was uplifted as a block, and China north of the Tsinling zone henceforth became essentially a continental area. Very few traces of Silurian deposits have been found throughout this area and it is probable that very little deposit was formed. North China has clearly functioned as a block, too rigid to be crumpled by folding movements, but yielding to intense pressure by faulting and fracturing. This is in strong contrast to the continued submergence of South China, which remained the scene of extensive marine deposition through Silurian times. The belt of the transverse Tsinling zone acted as the fulcrum between rising and sinking regions.

At the close of Silurian times, however, occurred the great orogenic movement known as the Caledonian, which powerfully affected China as it did Europe and other parts of the world. As a result of this revolution practically all China was raised for the first time above the waters. Not only were the North China blocks lifted higher and their relief accentuated and the uplands of south-east China re-elevated, but the softer marine rocks of south-west China were now crumpled into folds.

This position was not maintained for long in the geological sense. South China was again invaded by the sea in Devonian times and most of it remained submerged until the latter part of the Triassic period, but the sea was less widespread and more local than in earlier times and there were greater fluctuations. Yet the contrast between an essentially continental North China and a marine South China still remained, and this was of vital significance in the great coal-forming period of the Permo-Carboniferous which followed the Devonian. The conditions in North China were then essentially favourable to coal-formation. Its broad continental shelf oscillated between land and sea, but the seas, which then invaded it for the last time, were shallow and fluctuating, and the coal-measure forests flourished under swamp conditions similar to those of the Upper Carboniferous period in western Europe. The great coal-fields of Shansi and of North China as a whole are Permo-Carboniferous and are among the most important in the world. The use of the term Permo-Carboniferous in this connection implies a period of coal formation in the Far East more protracted than in western Europe, where coal is not associated with the Permian.

Before its close China experienced the effects of another great orogenic movement which, in its magnitude and the wide extent of its occurrence over the world, is comparable to the earlier Caledonian. The most general term for this revolution is Hercynian, but the Chinese manifestation of it, or at any rate of its final culminating phases, is now known as the Tungwu movement. As a result of this new uplift in Lower Permian times, much of South China was again elevated and there came into existence several basins in which were formed most of its more valuable coalfields. These too are classed as Permo-Carboniferous but they are far less extensive than those of the north-west.

### *The Mesozoic Period*

The Mesozoic age in China is sharply contrasted with that in Europe. In Europe Jurassic and Cretaceous times are associated with widespread marine invasions and deposition on a very large scale, and there was no great orogenic movement of crustal disturbance between the Hercynian, at the close of the Palæozoic age, and the mighty Alpine in the Tertiary. But in China the Mesozoic was the period in which marine conditions were finally brought to an end and the whole country emerged as a continental mass.

In the opening phase (the Triassic period) marine waters still



lingered in the south. In the transition from the Trias to the Jurassic known as the Rhaetic, came a second epoch of important coal-measure formation along the rising continental shore-line; many of the coalfields of South China, including the important Pinghsiang basin, on the borders of Kiangsi and Hunan, belong to this later phase, which lasted on into the early Jurassic (Liassic). Some are of even later date and owe their existence to isolated lake basins which continued well into the Jurassic period, when South China was becoming definitely continental.

The work of the Chinese geologists in recent years has gone to show that it was during Jurassic and Cretaceous times that the structural features of the country assumed their modern form, as a result of an important orogenic movement which has no counterpart in Europe and to which the term Yenshan or Yenshanian has been given (from a region to the north-west of Peiping where its effects are pronounced). This Yenshanian revolution was very prolonged and several phases of it have been distinguished. In one or more of these almost all parts of China were affected, notably the old coastal belt of the south-east, the palæozoic rocks of south and south-west China and the region in the north-west from which it takes its name. It was also accompanied by great igneous activity.

As a consequence of this movement the mountain framework of modern China, provided by the transverse Tsinling-Tapa shan in the centre, the Nanling in the south, and also the pronounced SW-NE ranges of the south-east and of the Mongolian border to the north-west of Peiping, seems to have received its final form. South China at last emerged as a continental area, but two important lake basins long remained scenes of Cretaceous deposits. The one was the Shensi basin, to the north of the Tsinling ranges, and the other the famous Red Basin of Szechwan, to the south of the Tapa shan, where the purple red clays with intercalated sandstones, to which it owes its name, were then laid down. The two basins have much in common, including their potential reserves of petroleum, in which China as a whole is distinctly deficient. The Red Basin of Szechwan was the last great region of China to emerge at the end of Cretaceous times, and the prominent NE-SW folds which characterize its eastern portion probably represent the final phases of the Yenshanian movement.

The igneous activity which accompanied this uplift is responsible for many valuable mineral deposits in south and south-west China;

the tin, copper, zinc, antimony and wolfram of the Nanling Belt and its borders are associated with the granitic bodies then intruded, and the rich iron deposits of the Yangtze valley are found in contact zones. It was a metallogenic epoch of great importance for China.

Deposits of early and middle Tertiary times are comparatively small in China, for the whole country was now continental, but the most valuable coalfields of Manchuria, including the important Fushun field near Mukden, are of Oligocene date, and some lignite-bearing formations were developed on the Mongolian border.

The extent to which China was affected by the great Alpine-Himalayan orogeny of mid-Tertiary times is still an unsettled question. The main feature lines of the country seem to have been already well established, but this last and very powerful earth revolution unquestionably played an important part in accentuating them and in producing the high relief of the country on the borders of Tibet and Indo-China. In the north, too, the great fault-scarps and fractures of the old Shansi and Shantung blocks and the subsidence of the North China Plain are attributed to the violent stresses set up by the movement, and a renewal of volcanic activity led to extensive lava flows which now cap much of the Mongolian plateau with basalt.

### *The Quaternary Period*

The latest chapter in the long geological record of China is concerned with the events of the Pliocene and Pleistocene phases which are so recent that they exert an important influence on modern surface conditions. The stages in the evolution of the actual land surface have been very carefully studied in North China, and several distinct cycles of erosion since the mid-Tertiary uplift have been distinguished. Here, however, it must suffice to call attention to two or three outstanding aspects.

In much of Europe and North America the Pleistocene is associated with the well-known Quaternary glaciation or Ice Age, which has done so much to model their surface features and to determine the character of their soils and river drainage. Evidence of widespread glaciation, of which many remnants in the form of shrinking glaciers are still left, has also long been known for the high mountain ranges of Central Asia, including those on the Chinese border. But until quite recently it was thought that practically all China Proper, although experiencing a much colder climate than at present, had escaped actual glaciation. This view

has had to be modified by the discovery during recent years of clear evidence of glaciation (U-shaped valleys, striations and erratics) in some of the hill groups, notably the Lu shan, of the Yangtze basin and of *roches moutonnées* and glacial pavements on the shores of the Poyang hu. Great, however, as is the interest aroused by these discoveries, it remains true that China was relatively little affected, and the jagged, pointed and often fantastic shapes of many of its mountains and hills are in sharp contrast with the smooth, rounded summits and slopes of much of western and northern Europe. Its flora, also, was far less impoverished by ice invasion.

The most far-reaching event of the cold Pleistocene period in China was certainly the deposition of the famous yellow earth or *loess*, which seems to have coincided with the final (Würm) stage of the Quaternary glaciation in Europe, and which was definitely subsequent to the appearance of human life in China, as evidenced by the discovery of the remains of 'Peking Man' in caves belonging to the deposits of an earlier cycle. The loess cover an immense area of north-west China, spreading over hills and valleys alike, and is undoubtedly a windborne deposit. Its raw materials were derived from the products of erosion in the Gobi region of Mongolia, which today is a bare rock desert ; these, in the chief period of loess formation, were carried by intensely strong, outflowing winds to the dissected hill region of north-west China where they were stabilized by plant growth. The distribution and significance of the loess are discussed in Chapter III (see pp. 64-7 and Fig. 23).

It remains finally to notice that in the Quaternary period China has experienced much regional uplift and subsidence. There is evidence of recent subsidence along the coast, particularly at Tientsin, but, on the other hand, there is general agreement that rapid up-lifting has been in progress in the mountainous region of western China and its borderlands. The great height of the Tibetan plateau and the adjacent plateaux of south-west China would seem to be at any rate partly due to this Quaternary uplift. Thus the contrast in relief, already very great, between the mountain background of the west and the adjacent plains is being accentuated.

# Appendix III

## GWOYEU ROMATZYH

- A. Concordance Gwoyeu Romatzyh<sup>1</sup>—Wade Transcription  
 B. Concordance Wade Transcription—Gwoyeu Romatzyh  
 C. Rules for the Orthographic Changes of the Basic Form

### A. CONCORDANCE GWOYEU ROMATZYH—WADE TRANSCRIPTION

Reprinted from Simon, W., and Lu, C. H., *Chinese Reader and Guide to Conversation* (Lund Humphries, London, 1943).

a, ar, aa, ah	= a <sup>1-4</sup>
ai, air, ae, ay	= ai <sup>1-4</sup>
an, *arn, aan, ann	= an <sup>1-4</sup>
ang, arng, *aang, anq	= ang <sup>1-4</sup>
au, aur, ao, aw	= ao <sup>1-4</sup>
ba <sup>2</sup> , bar, baa, bah	= pa <sup>1-4</sup>
bai, bair, bae, bay	= pai <sup>1-4</sup>
ban, *barn, baan, bann	= pan <sup>1-4</sup>
bang, *barnq, baang, banq	= pang <sup>1-4</sup>
bau, baur, bao, baw	= pao <sup>1-4</sup>
bei, *beir, beei, bey	= pei <sup>1-4</sup>
ben, *bern, been, benn	= pên <sup>1-4</sup>
beng, bernq, beeng, benq	= pêng <sup>1-4</sup>
bî, byi, bii, bih	= pi <sup>1-4</sup>
bian, *byan, bean, biann	= pien <sup>1-4</sup>
biau, *byau, beau, biaw	= piao <sup>1-4</sup>
bie, bye, biee, bieh	= pieh <sup>1-4</sup>
bin, *byn, biin, binn	= pin <sup>1-4</sup>
bing, *byng, biing, binq	= ping <sup>1-4</sup>
bo, bor, boo, boh	= po <sup>1-4</sup>
bu, bwu, buu, buh	= pu <sup>1-4</sup>
cha, char, *chaa, chah	= ch'a <sup>1-4</sup>
chai, chair, chae, chay	= ch'ai <sup>1-4</sup>
chan, charn, chaan, chann	= ch'an <sup>1-4</sup>
chang, charng, chaang, chang	= ch'ang <sup>1-4</sup>
chau, chaur, chao, *chaw	= ch'ao <sup>1-4</sup>
che, *cher, chee, cheh	= ch'ê <sup>1-4</sup>
chen, chern, cheen, chenn	= ch'ên <sup>1-4</sup>
cheng, cherng, cheeng, cheng	= ch'êng <sup>1-4</sup>
chi, chyi, chii, chih	= ch'i <sup>1-4</sup>
chia, chya, chea, chiah	= ch'ia <sup>1-4</sup>
chian, chyan, chean, chiann	= ch'ien <sup>1-4</sup>

chiang, chyang, cheang, chianq	= ch'iang <sup>1-4</sup>
chiao, chyau, cheau, chiau	= ch'iao <sup>1-4</sup>
chie, chye, chiee, chieh	= ch'ieh <sup>1-4</sup>
chin, chyn, chiin, chinn	= ch'in <sup>1-4</sup>
ching, chying, chiing, chinq	= ch'ing <sup>1-4</sup>
chiong, chyong, *cheong, *chionq	= ch'iong <sup>1-4</sup>
chiou, chyou, cheou, *chiow	= ch'iu <sup>1-4</sup>
chiu, chyu, cheu, chiuh	= ch'ü <sup>1-4</sup>
chuan, chyuan, cheuan, chiuann	= ch'üan <sup>1-4</sup>
chiue, chyue, *cheue, chiueh	= ch'üeh <sup>1-4</sup>
chiun, chyun, *cheun, *chiunn	= ch'ün <sup>1-4</sup>
chong, chornq, choong, chonq	= ch'ung <sup>1-4</sup>
chou, chour, choou, chow	= ch'ou <sup>1-4</sup>
chu, chwu, chuu, chuh	= ch'u <sup>1-4</sup>
chua, *chwa, *choa, *chuah	= ch'ua <sup>1-4</sup>
chuai, chwai, choai, chuay	= ch'uai <sup>1-4</sup>
chuan, chwan, choan, chuann	= ch'uan <sup>1-4</sup>
chuang, chwang, choang, chuanq	= ch'uang <sup>1-4</sup>
chuei, chwei, *choei, chuey	= ch'ui <sup>1-4</sup>
chuen, chwen, choen, *chuenn	= ch'un <sup>1-4</sup>
chuo, *chwo, *chuoo, chuoh	= ch'o <sup>1-4</sup>
chy, chyr, chyy, chyh	= ch'ih <sup>1-4</sup>

<sup>1</sup> Basic forms in heavy type. Asterisked variants do not occur as independent words, or as elements of Chinese compounds.

<sup>2</sup> Occurring also 'toneless' as 'suggestive particle'.

da, dar, daa, dah	= ta <sup>1-4</sup>
dai, dair, dae, day	= tai <sup>1-1</sup>
dan, *darn, daan, dann	= tan <sup>1-4</sup>
dang, *darnq, daang, danq	= tang <sup>1-1</sup>
dau, *daur, dao, daw	= tao <sup>1-1</sup>
*de <sup>1</sup> , der, *dee, *deh	= tē <sup>1-1</sup>
*dei, *deir, deei, *dey	= tei <sup>1-4</sup>
deng, *derng, deeng, denq	= tēng <sup>1-4</sup>
dī, dyi, dii, dih	= ti <sup>1-1</sup>
dian, *dyan, dean, diann	= tien <sup>1-1</sup>
diau, *dyau, deau, diaw	= taio <sup>1-1</sup>
die, dye, *diee, *dih	= tieh <sup>1-4</sup>
ding, *dyng, diing, dinq	= ting <sup>1-4</sup>
diou, *dyou, *deou, *diow	= tiu <sup>1-4</sup>
dong, *dornq, doong, donq	= tung <sup>1-4</sup>
dou, *dour, doou, dow	= tou <sup>1-4</sup>
du, dwu, duu, duh	= tu <sup>1-4</sup>
duan, *dwan, doan, duann	= tuan <sup>1-4</sup>
duei, *dwei, *doei, duey	= tui <sup>1-1</sup>
duen, *dwen, doen, duenn	= tun <sup>1-4</sup>
duo, dwo, duoo, duoh	= to <sup>1-4</sup>
e, er, ee, eh	= { e <sup>1-4</sup> o <sup>1-4</sup>
*el, erl, eel, ell	= êrh <sup>1-4</sup> †
en, *ern, *een, enn	= ên <sup>1-4</sup>
eng, *ernq, *eeng, *enq	= êng <sup>1-4</sup>
fa, far, faa, fah	= fa <sup>1-4</sup>
fan, farn, faan, fann	= fan <sup>1-4</sup>
fang, farnq, faang, fanq	= fang <sup>1-4</sup>
fei, feir, feei, fey	= fei <sup>1-4</sup>
fen, fern, feen, fenn	= fēn <sup>1-4</sup>
feng, fernq, feeng, fenq	= fēng <sup>1-4</sup>
*fo, for, *foo, foh	= fo <sup>1-4</sup>
*fou, four, foou, fow	= fou <sup>1-4</sup>
fu, fwu, fuu, fuh	= fu <sup>1-4</sup>
ga, gar, gaa, gah	= ka <sup>1-4</sup>
gai, *gair, gae, gay	= kai <sup>1-4</sup>
gan, *garn, gaan, gann	= kan <sup>1-4</sup>
gang, *garng, gaang, ganq	= kang <sup>1-1</sup>
gau, *gaur, gao, gaw	= kao <sup>1-4</sup>
ge <sup>2</sup> , ger, gee, geh	= { kē <sup>1-4</sup> ko <sup>1-4</sup>
*gei, *geir, geei, *gey	= kei <sup>1-4</sup>
gen, gern, *geen, genn	= kēn <sup>1-4</sup>
geng, *gerng, geeng, genq	= kēng <sup>1-4</sup>

gong, *gornq, goong, gonq	= kung <sup>1</sup>
gou, *gour, goou, gow	= kou <sup>1-1</sup>
gu, gwu, guu, guh	= ku <sup>1-4</sup>
gua, *gwa, goa, guah	= kua <sup>1-1</sup>
guai, *gwai, goai, guay	= kuai <sup>1-4</sup>
guan, *gwan, goan, guann	= kuan <sup>1-4</sup>
guang, *gwang, goang, quanq	= kuang <sup>1-4</sup>
guei, *gwei, goei, guey	= kwei <sup>1-4</sup>
*guen, *gwen, goen, guenn	= kun <sup>1-4</sup>
guo, gwo, guoo, guoh	= kuo <sup>1-4</sup>
ha, har, haa, *hah	= ha <sup>1-4</sup>
hai, hair, hae, hay	= hai <sup>1-4</sup>
han, harn, haan, hann	= han <sup>1-4</sup>
hang, harnq, *haang, *hanq	= hang <sup>1-4</sup>
hau, haur, hao, hav	= hao <sup>1-4</sup>
he, her, *hee, heh	= { hē <sup>1-4</sup> ho <sup>1-4</sup>
hei, *heir, heei, *hey	= hei <sup>1-4</sup>
*hen, hern, heen, henn	= hēn <sup>1-4</sup>
heng, herng, *heeng, henq	= hēng <sup>1-4</sup>
hong, horng, hoong, honq	= hung <sup>1-4</sup>
hou, hour, hoou, how	= hou <sup>1-4</sup>
hu, hwu, huu, huh	= hu <sup>1-4</sup>
hua, hwa, *hoa, huah	= hua <sup>1-4</sup>
*huai, hwai, *hoai, huay	= huai <sup>1-4</sup>
huan, hwan, hoan, huann	= huan <sup>1-4</sup>
huang, hwang, hoang, huanq	= huang <sup>1-4</sup>
huei, hwei, hoei, huey	= hui <sup>1-4</sup>
huen, hwen, hoen, huenn	= hun <sup>1-4</sup>
huo, hwo, huoo, huoh	= huo <sup>1-4</sup>
i, yi, yii, yih	= i <sup>1-4</sup>
ia, ya, yea, yah	= ya <sup>1-4</sup>
*iai, yai, *yeai, *yay	= yai <sup>1-4</sup>
ian, yan, yean, yann	= yen <sup>1-4</sup>
iang, yang, yeang, yanq	= yang <sup>1-4</sup>
iau, yau, yeau, yaw	= yao <sup>1-1</sup>
ie, ye, yee, yeh	= yeh <sup>1-4</sup>
in, yn, yin, yinn	= yin <sup>1-4</sup>
ing, yng, yuing, yinq	= ying <sup>1-4</sup>
iong, yong, yeong, yonq	= yung <sup>1-4</sup>
iou, you, yeou, yow	= yu <sup>1-4</sup>
iu, yu, yeu, yuh	= yü <sup>1-4</sup>
iuann, yuan, yeuan, yuann	= yüan <sup>1-4</sup>
iue, *yue, *yeue, yueh	= yüeh <sup>1-4</sup>
iun, yun, yeun, yunn	= yün <sup>1-4</sup>

<sup>1</sup> Occurring also 'toneless' as 'connective suffix' and in certain other grammatical functions. In the Wade transcription it is transcribed *ti*<sup>1</sup> as 'connective suffix', in other functions either *ti*<sup>1</sup> or *te*<sup>2</sup>.

<sup>2</sup> Occurring also 'toneless' after numerals in the meaning 'piece'.

† Occurring also 'toneless' and shortened as 'diminutive suffix'.

j <sup>i</sup>	
ja, jar, jaa, jah	= cha <sup>1-1</sup>
jai, jair, jae, jay	= chai <sup>1-1</sup>
jan, *jarn, jaan, jann	= chan <sup>1-1</sup>
jang, *jarn, jaang, janq	= chang <sup>1-1</sup>
jau, jaur, jao, jaw	= chao <sup>1-1</sup>
je <sup>1</sup> , jer, jee, jeh	= chē <sup>1-1</sup>
jen, *jern, jeen, jenn	= chēn <sup>1-1</sup>
jeng, *jerng, jeeng, jenq	= chēng <sup>1-1</sup>
je <sup>2</sup>	
ji, jyi, jii, jih	= chi <sup>1-1</sup>
jia, jya, jea, jiah	= chia <sup>1-1</sup>
jian, *jyan, jean, jiann	= chien <sup>1-1</sup>
jiang, *jyang, jeang, jianq	= Chiang <sup>1-1</sup>
jiau, jyau, jeau, jiaw	= chiao <sup>1-1</sup>
jie, jye, jiee, jieh	= chieh <sup>1-1</sup>
jīn, *jyn, jiin, jinn	= chin <sup>1-1</sup>
jīng, *jyng, jiing, jinq	= ching <sup>1-1</sup>
jiong, *jyong, jeong, *jionq	
	= chiung <sup>1-1</sup>
jiou, *jyou, jeou, jiow	= chiu <sup>1-1</sup>
jiu, jyu, jeu, jiuu	= chū <sup>1-1</sup>
jiuan, *jyuan, jeuan, jiuan	
	= chüan <sup>1-1</sup>
jiue, jyue, jeue, *jiueh	= chüeh <sup>1-1</sup>
jiun, *jyun, jeun, jiunn	= chün <sup>1-1</sup>
jong, *jorn, joong, jonq	= chung <sup>1-1</sup>
jou, jour, jout, jow	= chou <sup>1-1</sup>
ju, jvu, juu, juh	= chu <sup>1-1</sup>
jua, *jwa, joa, *juah	= chua <sup>1-1</sup>
juai, *jwai, joat, juay	= chuai <sup>1-1</sup>
juan, *jwan, joan, juann	= chuan <sup>1-1</sup>
juang, *jwang, joang, juanq	
	= chuang <sup>1-1</sup>
juei, *jwei, *joei, juey	= chui <sup>1-1</sup>
juen, *jwen, joen, *juenn	= chün <sup>1-1</sup>
juo, jwo, *juoo, *juoh	= cho <sup>1-1</sup>
jy, jyr, jyy, jyh	= chih <sup>1-1</sup>
ka, *kar, kaa, kah	= k'a <sup>1-1</sup>
kai, *kair, kae, kay	= k'ai <sup>1-1</sup>
kan, *karn, kaan, kann	= k'an <sup>1-1</sup>
kang, karng, kaang, kanq	
	= k'ang <sup>1-1</sup>
kau, *kaur, kao, kaw	= k'ao <sup>1-1</sup>
ke, ker, kee, keh	= { k'ē <sup>1-1</sup> k'o <sup>1-1</sup>
*ken, *kern, keen, kenn	= k'ēn <sup>1-1</sup>
keng, *kerng, keeng, *kenq	
	= k'ēng <sup>1-1</sup>
kong, *korn, koong, konq	
	= k'ung <sup>1-1</sup>
kou, *kour, koou, kow	= k'ou <sup>1-1</sup>

ku, *kwu, kuu, kuh	= k'u <sup>1-1</sup>
kua, *kwa, koa, kuah	= k'ua <sup>1-1</sup>
kuai, *kwai, koai, kuay	= k'uai <sup>1-1</sup>
kuan, *kwan, koan, *kuann	
	= k'uan <sup>1-1</sup>
kuang, kwang, *koang, kuanq	
	= k'uang <sup>1-1</sup>
kuei, kwei, koei, kuey	= k'uei <sup>1-1</sup>
kuen, *kwen, koen, kuenn	
	= k'un <sup>1-1</sup>
*kuo, *kwo, *kuoo, kuoh	= k'uo <sup>1-1</sup>
lha, la <sup>2</sup> , laa, lah	= la <sup>1-1</sup>
*lhai, lai, *lae, lay	= lai <sup>1-1</sup>
*lhan, lan, laan, lann	= lan <sup>1-1</sup>
*lhang, lang, laang, lanq	= lang <sup>1-1</sup>
lhau, lau, lao, law	= lao <sup>1-1</sup>
lhe, le <sup>2</sup> , *lee, leh	= lê <sup>1-1</sup>
lhei, lei, leei, ley	= lei <sup>1-1</sup>
*lheng, leng, leeng, lenq	= lēng <sup>1-1</sup>
lhi, li, lii, lih	= li <sup>1-1</sup>
*lhia, *lia, lea, *liah	= lia <sup>1-1</sup>
*lhian, lian, lean, liann	= lien <sup>1-1</sup>
*lhiang, liang, leang, lianq	
	= liang <sup>1-1</sup>
lhiau, liau, leau, liaw	= liao <sup>1-1</sup>
lhie, lie, liee, lieh	= lieh <sup>1-1</sup>
*lhin, lin, liin, linn	= lin <sup>1-1</sup>
lhing, ling, liing, ling	= ling <sup>1-1</sup>
lhiau, liou, leou, liow	= liu <sup>1-1</sup>
*lhiu, liu, leu, liuh	= lü <sup>1-1</sup>
*lhiuan, liuan, leuan, *liuann	
	= lüan <sup>1-1</sup>
*lhiue, *liue, *leue, liueh	= lüeh <sup>1-1</sup>
*lhiun, liun, *leun, *liunn	
	= lün <sup>1-1</sup>
*lhong, long, loong, lonq	= lung <sup>1-1</sup>
lhoo, lou, loou, low	= lou <sup>1-1</sup>
lhu, lu, luu, luh	= lu <sup>1-1</sup>
*lhuau, luan, loan, luann	= luan <sup>1-1</sup>
lhuen, luen, *loen, luenn	= lun <sup>1-1</sup>
luo, luo, luoo, luoh	= lo <sup>1-1</sup>
mha, ma <sup>1</sup> , maa, mah	= ma <sup>1-1</sup>
*mhai, mai, mae, may	= mai <sup>1-1</sup>
mhan, man, maan, mann	= man <sup>1-1</sup>
*mhang, mang, maang, *manq	
	= mang <sup>1-1</sup>
mhau, mau, mao, maw	= mao <sup>1-1</sup>
me <sup>1</sup>	
*mhei, mei, meei, mey	= mei <sup>1-1</sup>
mhen, men <sup>2</sup> , *meen, mena	
	= mēn <sup>1-1</sup>

<sup>1</sup> Occurring also 'toneless' as 'durative suffix', then written *j̄*. The Wade transcription for the suffix is *cho*<sup>2</sup>.

<sup>2</sup> *jei* is a contraction of *jehi* ('this one'); the Wade transcription would be *chē<sup>1-1</sup>*.

<sup>3</sup> *la* and, more frequently, *le* occur 'toneless' as 'perfective particles'; the Wade transcription is *la<sup>1</sup>* or *lao<sup>3</sup>*.

<sup>4</sup> *ma* and *me* occur 'toneless' as 'interrogative particles'. The Wade transcriptions are *ma<sup>1</sup>* and *mo<sup>1</sup>*.

<sup>5</sup> Occurring also 'toneless' as 'plural suffix'.

mheng, <b>meng</b> , meeng, menq	=mēng <sup>1-4</sup>
mhi, <b>mi</b> , mii, mih	=mi <sup>1-4</sup>
*mhian, <b>mian</b> , mean, miann	=mien <sup>1-4</sup>
mhiau, <b>miau</b> , meau, miaw	=miao <sup>1-4</sup>
mhie, * <b>mie</b> , *miee, mieh	=mieh <sup>1-4</sup>
*mhin, <b>min</b> , miin, *minn	=min <sup>1-4</sup>
*mhing, <b>ming</b> , miing, minq	=ming <sup>1-4</sup>
*mhiou, * <b>miou</b> , *meou, miow	=miu <sup>1-4</sup>
mho, <b>mo</b> , moo, moh	=mo <sup>1-4</sup>
*mhou, <b>mou</b> , moou, mow	=mou <sup>1-4</sup>
*mhu, <b>mu</b> , muu, muh	=mu <sup>1-4</sup>
nha, <b>na</b> <sup>1</sup> , naa, nah	=na <sup>1-4</sup>
*nhai, * <b>nai</b> , nae, nay	=nai <sup>1-4</sup>
nhan, <b>nan</b> , naan, nann	=nan <sup>1-4</sup>
nhang, <b>naŋ</b> , naang, nanq	=naŋ <sup>1-4</sup>
*nhau, <b>nau</b> , nao, naw	=nao <sup>1-4</sup>
*nhe, <b>ne</b> <sup>2</sup> , *nee, neh	=nê <sup>1-4</sup>
*nhei, * <b>nei</b> , neei <sup>3</sup> , ney <sup>3</sup>	=nei <sup>1-4</sup>
*nhen, * <b>nen</b> , *neen, nenn	=nên <sup>1-4</sup>
*nheng, <b>neng</b> , *neeng, nenq	=nēng <sup>1-4</sup>
*nhi, <b>ni</b> , nii, nih	=ni <sup>1-4</sup>
nhian, <b>nian</b> , nean, niann	=nien <sup>1-4</sup>
*nhiang, <b>niang</b> , *neang, nianq	=niang <sup>1-4</sup>
*nhiau, * <b>niau</b> , neau, niaw	=niao <sup>1-4</sup>
nhie, <b>nie</b> , *niee, nieh	=nieh <sup>1-4</sup>
*nhin, <b>nin</b> , *niin, *ninn	=nin <sup>1-4</sup>
*nhing, <b>ning</b> , niing, ninq	=ning <sup>1-4</sup>
nhiou, <b>niou</b> , neou, niow	=niu <sup>1-4</sup>
*nhui, * <b>niu</b> , neu, niuh	=nü <sup>1-4</sup>
*nhue, * <b>niue</b> , *neue, niueh	=nüeh <sup>1-4</sup>
*nhong, <b>nong</b> , *noong, nonq	=nung <sup>1-4</sup>
*nhou, * <b>nou</b> , *noou, now	=nou <sup>1-4</sup>
*nhu, <b>nu</b> , nuu, nuh	=nu <sup>1-4</sup>
*nhuan, * <b>nuan</b> , noan, *nuann	=nuan <sup>1-4</sup>
*nhuen, * <b>nuen</b> , *noen, nuenn	=nun <sup>1-4</sup>
*nhuo, <b>nuo</b> , *nuoo, nuoh	=no <sup>1-4</sup>

ou, * <b>our</b> , oou, ow	=ou <sup>1-4</sup>
pa, par, * <b>paa</b> , pah	=p'a <sup>1-4</sup>
pai, pair, pae, pay	=p'ai <sup>1-4</sup>
pan, parn, * <b>paan</b> , pann	=p'an <sup>1-4</sup>
pang, parng, paang, panq	=p'ang <sup>1-4</sup>
pau, paur, pao, paw	=p'ao <sup>1-4</sup>
pei, peir, * <b>peei</b> , pey	=p'ei <sup>1-4</sup>
pen, pern, * <b>peen</b> , penn	=p'en <sup>1-4</sup>
peng, perng, peeng, penq	=p'ēng <sup>1-4</sup>
pi, pyi, pii, pih	=p'i <sup>1-4</sup>
pian, pyan, pean, piann	=p'ien <sup>1-4</sup>
piau, pyau, peau, piaw	=p'iao <sup>1-4</sup>
pie, * <b>pye</b> , piee, *pich	=p'ieh <sup>1-4</sup>
pin, pyn, piin, pinn	=p'in <sup>1-4</sup>
ping, pyng, * <b>piing</b> , pinq	=p'ing <sup>1-4</sup>
po, por, poo, poh	=p'o <sup>1-4</sup>
pou, pour, poou, *pow	=p'ou <sup>1-4</sup>
pu, pwu, puu, puh	=p'u <sup>1-4</sup>
ra <sup>4</sup>	
*rhan, <b>ran</b> <sup>4</sup> , raan, *rann	=jan <sup>1-4</sup>
*rhang, <b>rang</b> <sup>4</sup> , raang, ranq	=jang <sup>1-4</sup>
*rhau, <b>rau</b> <sup>4</sup> , rao, raw	=jao <sup>1-4</sup>
*rhe, * <b>re</b> <sup>4</sup> , ree, reh	=jê <sup>1-4</sup>
*rhen, <b>ren</b> , reon, renn	=jên <sup>1-4</sup>
rheng, <b>reng</b> <sup>4</sup> , reeng, *renq	=jēng <sup>1-4</sup>
ri <sup>4</sup>	
ro <sup>4</sup>	
*rhong, <b>rong</b> <sup>4</sup> , roong, *ronq	=jung <sup>1-4</sup>
*rhou, <b>rou</b> , roou, row	=jou <sup>1-4</sup>
*rhu, <b>ru</b> <sup>4</sup> , ruu, ruh	=ju <sup>1-4</sup>
*rhuan, <b>ruan</b> , roan, *ruann	=juan <sup>1-4</sup>
*rhuei, <b>ruei</b> , roei, ruey	=jui <sup>1-4</sup>
*rhuen, <b>ruen</b> , *roen, ruenn	=jun <sup>1-4</sup>
*rhuo, <b>ruo</b> , *ruoo, ruoh	=jo <sup>1-4</sup>
*rhy, * <b>ry</b> , *ryy, ryh	=jih <sup>1-4</sup>
sa, * <b>sar</b> , saa, sah	=sa <sup>1-4</sup>
sai, * <b>sair</b> , *sac, say	=sai <sup>1-4</sup>
san, * <b>sarn</b> , saan, sann	=san <sup>1-4</sup>
sang, * <b>sarn</b> , saang, sanq	=sang <sup>1-4</sup>
sau, * <b>saur</b> , sao, saw	=sao <sup>1-4</sup>

1 Occurring also 'toneless' as 'progressive particle'.

2 Occurring also 'toneless' as 'interrogative particle'. It is then transcribed as *mi*<sup>1</sup> in the Wade system.

3 The variants *neei* and *ney* occur also as contractions of *naa-i* 'which one?' and *nai-i* 'that one'. The Wade transcriptions would then be *na<sup>3</sup> i* and *na<sup>4</sup> i*.

4 In *G.R.* *ra*, *re*, *ri*, *ro*, *ru*, etc., are written, but *la*, *le*, *li*, *lo*, *lu*, etc., pronounced, when the *l* is made to represent the *r*-sound, unfamiliar to the Chinese, with which they are confronted in non-Chinese proper-names or terms. While the Wade transcription is bound to write *l* in accordance with the actual pronunciation, *G.R.* refrains in principle from 'sinisizing' foreign names and terms, and saves the reader much fruitless guess-work in this way.

*se, *ser, *see, seh	=sê <sup>1-4</sup>
sen, *sern, *seen, *senn	=sên <sup>1-4</sup>
seng, *serng, *seeng, *senq	=sêng <sup>1-4</sup>
sh <sup>1</sup>	
sha, shar, shaa, shah	=sha <sup>1-4</sup>
shai, *shair, shae, shay	=shai <sup>1-4</sup>
shan, *sharn, shaan, shann	=shan <sup>1-4</sup>
shang, *sharng, shaang, shanq	=shang <sup>1-4</sup>
shau, shaur, shao, shaw	=shao <sup>1-4</sup>
she, sher, shee, sheh	=shê <sup>1-4</sup>
*shei, sheir, *sheei, *shey	=shei <sup>1-4</sup>
shen, shern, sheen, shenn	=shên <sup>1-4</sup>
sheng, sherng, sheeng, shenq	=shêng <sup>1-4</sup>
shi, shyi, shii, shih	=hsi <sup>1-4</sup>
shia, shya, *shea, shiah	=hsia <sup>1-4</sup>
shian, shyan, shean, shiann	=hsien <sup>1-4</sup>
shiang, shyang, sheang, shianq	=hsiang <sup>1-4</sup>
shiau, shyau, sheau, shiaw	=hsiao <sup>1-4</sup>
shie, shye, shiee, shieh	=hsieh <sup>1-4</sup>
shin, shyn, shiin, shinn	=hsin <sup>1-4</sup>
shing, shyng, shiing, shinq	=hsing <sup>1-4</sup>
shiong, shyong, *sheong, shionq	=hsiung <sup>1-4</sup>
shiou, *shyou, sheou, shiow	=hsiu <sup>1-4</sup>
shiu, shyu, sheu, shiuh	=hsü <sup>1-4</sup>
shüan, shüan, sheuan, shüann	=hsüan <sup>1-4</sup>
shiue, shyue, sheue, shiueh	=hsüeh <sup>1-4</sup>
shiun, shyun, *sheun, shiunn	=hsün <sup>1-4</sup>
shou, shour, shoou, show	=shou <sup>1-4</sup>
shu, shwu, shuu, shuh	=shu <sup>1-4</sup>
shua, *shwa, shoa, *shuah	=shua <sup>1-4</sup>
shuai, *shwai, shoi, shuay	=shuai <sup>1-4</sup>
shuan, *shwan, *shoan, shuann	=shuan <sup>1-4</sup>
shuang, *shwang, shoang, *shuanq	=shuang <sup>1-4</sup>
*shuei, shwei, shoei, shuey	=shui <sup>1-4</sup>
*shuen, *shwen, shoen, shuenn	=shun <sup>1-4</sup>

shuo, *shwo, *shuoo, shuoh	=shuo <sup>1-4</sup>
shy, shy, shyy, shyh <sup>1</sup>	=shih <sup>1-4</sup>
song, sorng, soong, sonq	=sung <sup>1-4</sup>
sou, *sour, soou, sow	=sou <sup>1-4</sup>
su, swu, *suu, suh	=su <sup>1-4</sup>
suan, *swan, *soan, suann	=suan <sup>1-4</sup>
suei, swei, soei, suey	=sui <sup>1-4</sup>
suen, *swen, soen, suenn	=sun <sup>1-4</sup>
suo, swo, suoo, *suoh	=so <sup>1-4</sup>
sy, *syr, syy, syh	=ssü <sup>1-4</sup>
ta, *tar, taa, tah	=t'a <sup>1-4</sup>
tai, tair, *tae, tay	=t'ai <sup>1-4</sup>
tan, tarn, taan, tann	=t'an <sup>1-4</sup>
tang, tarn, taang, tanq	=t'ang <sup>1-4</sup>
tau, taur, tao, taw	=t'ao <sup>1-4</sup>
te, *ter, *tee, teh	=t'ê <sup>1-4</sup>
*tei <sup>2</sup> , *teir, *teei, *tey	=t'ei <sup>1-4</sup>
teng, terng, *teeng, *tenq	=t'êng <sup>1-4</sup>
ti, tyi, tii, tih	=t'i <sup>1-4</sup>
tian, tyan, tean, tiann	=t'ien <sup>1-4</sup>
tiau, tyau, teau, tiaw	=t'iao <sup>1-4</sup>
tie, *tye, tiee, tieh	=t'ieh <sup>1-4</sup>
ting, tyng, tiing, tinq	=t'ing <sup>1-4</sup>
tong, torng, toong, tonq	=t'ung <sup>1-4</sup>
tou <sup>3</sup> , tour, too, tow	=t'ou <sup>1-4</sup>
tso, *tsar, tsaa, *tsah	=ts'a <sup>1-4</sup>
tsai, tsair, tsae, tsay	=ts'ai <sup>1-4</sup>
tsan, tsarn, tsaan, tsann	=ts'an <sup>1-4</sup>
tsang, tsarn, tsaaing, *tsanq	=ts'ang <sup>1-4</sup>
tsau, tsaur, tsao, tsaw	=ts'ao <sup>1-4</sup>
*tse, *tser, *tsee, tseh	=ts'ê <sup>1-4</sup>
tsen, tsern, *tseen, *tsenn	=ts'ên <sup>1-4</sup>
tseng, tserng, *tseeng, tsenq	=ts'êng <sup>1-4</sup>
tsong, tsorng, *tsoong, *tsongq	=ts'ung <sup>1-4</sup>
*tsou, *tsour, *tsoou, tsow	=ts'ou <sup>1-4</sup>
tsu, tswu, *tsuu, tsuh	=ts'u <sup>1-4</sup>
tsuan, tswan, *tsoan, tsuann	=ts'uan <sup>1-4</sup>
tsuei, *tswei, tsoei, tsuey	=ts'ui <sup>1-4</sup>
tsuen, tswen, tsoen, tsuenn	=ts'un <sup>1-4</sup>
tsuo, tswu, tsuoo, tsuoh	=ts'ou <sup>1-4</sup>
tsy, tsyr, tsyy, tsyh	=tz'ü <sup>1-4</sup>
tu, twu, tuu, tuh	=t'u <sup>1-4</sup>
tuan, twan, toan, tuann	=t'uan <sup>1-4</sup>

<sup>1</sup> When functioning as the 'copula', i.e. in the meaning 'is' or 'are', *shyh* is generally 'toneless', and therefore written *sh*. In the phrase *yu sh(yh)* 'then' (lit. 'in this') and in some other cases *shyh* retains its original pronominal meaning 'this', and is then said in the fourth tone.

<sup>2</sup> *tei*, etc., have only been included because the Wade system notes the sound group *t'ei*.  
<sup>3</sup> *tou* occurs also as 'toneless' in compounds like *chyantou* 'in front', *shangtou* 'on top'.





B. CONCORDANCE WADE TRANSCRIPTION—GWOYEU ROMATZYH<sup>1</sup>

Reprinted from Simon, W., and Lu, C. H., *Chinese Reader and Guide to Conversation* (Lund Humphries, London, 1943).

The following table clearly shows that the basic forms of *Gwoyau Romatzyh* are very near the Wade system. The main difference lies in the initials: The pairs *b - p*, *d - t*, *g - k*, *ts - ts'* and *j - ch* correspond to *p - p'*, *t - t'*, *k - k'*, *ts (ts') - ts' (ts')* and *ch - ch'* in the Wade system. *G.R. r* corresponds to *j*, *G.R. sh* stands for both *sh* and *hs* and *G.R. s* for both *s* and *ss* in the Wade system. Though there are a number of differences in the finals, they are all of minor importance.

a	a	ch'ing	ching	fa	fa
ai	ai	chiu	jiou	fan	fan
an	an	ch'iu	chiou	fang	fang
ang	ang	chiung	jiong	fei	fei
ao	au	ch'iung	chiong	fên	fên
<b>cha</b>	ja	cho	juo	fêng	fêng
ch'a	cha	ch'o	chuo	fo	fo
chai	jai	chou	jou	fou	fou
ch'ai	chai	ch'ou	chou	fu	fu
chan	jan	chu	ju	<b>ha</b>	ha
ch'an	chan	ch'u	chu	hai	hai
chang	jang	chua	jua	han	han
ch'ang	chang	ch'ua	chua	hang	hang
chao	jau	chuai	juai	hao	hau
cha'o	chau	ch'uai	chuai	hê (ho)	he
chê	je	chuan	juan	hei	hei
ch'ê	che	chuang	juang	hên	hen
chên	jen	ch'uang	chuang	hêng	heng
ch'ên	chen	chui	juei	ho (hê)	he
chêng	jeng	ch'ui	chuei	hou	hou
ch'êng	cheng	chun	juen	hsi	shi
chi	ji	ch'un	chuen	hsia	shia
ch'i	chi	chung	jong	hsiang	shiang
chia	jia	ch'ung	chong	hsiao	shiau
ch'ia	chia	chü	jiu	hsieh	shie
chiang	jiang	ch'ü	chiu	hsien	shian
ch'iang	chiang	chüan	jiuan	hsin	shin
chiao	jiau	ch'üan	chiuan	hsing	shing
ch'iao	chiau	chüeh	jiue	hsiu	shiou
chieh	jie	ch'üeh	chiue	hsiung	shiong
ch'ieh	chie	chün	jiun	hsü	shiu
chien	jian	ch'ün	chiun	hsüan	shiuau
ch'ien	chian			hsüeh	shieue
chih	jy			hsün	shiun
ch'ih	chy	ê (o)	e	hu	hu
chin	jin	ên	en	hua	hua
ch'in	chin	êng	eng	huai	huai
ching	jing	êrh	el	huan	huan

<sup>1</sup> Basic forms only.

huang	huang	k'uo	kuo	nien	nian
hui	huei			nin	nin
hun	huen	la	la	ning	ning
hung	hong	lai	lai	niu	niou
huo	huo	lan	lan	no	nuo
		lang	lang	nou	nou
i (yi)	i	lao	lau	nu	nu
jan	ran	lê	le	nuan	nuan
jang	rang	lei	le	nun	nuen
jao	rau	lêng	leng	nung	nong
jê (jo)	re	li	li	nü	niu
jên	ren	lia	lia	nüeh	niue
jêng	reng	liang	liang		
jih	ry	liao	liau	o (ê)	o
jo (jê)	ruo	lieh	lie	ou	ou
jou	rou	lien	lian		
ju	ru	lin	lin	pa	ba
juan	ruan	ling	ling	p'a	pa
jui	ruai	liu	liou	pai	bai
jun	ruen	lo	luo	p'ai	pai
jung	rong	lou	lou	pan	ban
		lu	lu	p'an	pan
ka	ga	luan	luan	pang	bang
k'a	ka	lun	luen	p'ang	pang
kai	gai	lung	long	pao	bau
k'ai	kai	lû	liu	p'ao	pau
kan	gan	lûan	liuan	pei	bei
ka'n	kan	lûeh	liue	p'ei	pei
kang	gang	lûn	liun	pên	ben
k'ang	kang			p'ên	pen
kao	gau	ma	ma	pêng	beng
k'ao	kau	mai	mai	p'êng	peng
kê (ko)	ge	man	man	pi	bi
k'ê (k'o)	ke	mang	mang	p'i	pi
kei	gei	mao	mau	piao	biau
kên	gen	mei	mei	p'iao	piau
k'ên	ken	mên	men	pieh	bie
kêng	geng	mêng	meng	p'ieh	pie
k'êng	keng	mi	mi	p'ien	bian
ko (ké)	ge	miao	miau	pin	bin
k'o (k'ê)	ke	mieh	mie	p'in	pin
kou	gou	mien	mian	ping	bing
k'ou	kou	min	min	p'ing	ping
ku	gu	mîng	mîng	po	bo
k'u	ku	miu	miou	p'o	po
kua	gua	mo	mo	p'ou	pou
k'ua	kua	mou	mou	pu	bu
kuai	guai	mu	mu	p'u	pu
k'uai	kuai	na	na		
kuan	guan	nai	nai	sa	sa
k'uan	kuan	nan	nan	sai	sai
kuang	guang	nang	nang	san	san
k'uang	kuang	nau	nau	sang	sang
kuei	guei	nei	nei	sao	sau
k'uei	kuei	nên	nen	sê	se
kun	guen	nêng	neng	sên	sen
k'un	kuen	ni	ni	sêng	seng
kung	gong	niang	niang	sha	sha
k'ung	kong	niao	niau	shai	shai
kuo	guo	nieh	nie	shan	shan

shang	shang	ti	di	tsun	tzuen
shao	shau	t'i	ti	ts'un	tsuen
shê	she	tiao	diao	tsung	tzong
shei	shei	t'iao	tiao	ts'ung	tsong
shên	shen	tieh	die	tu	du
shêng	sheng	t'ieh	tie	t'u	tu
shih	shy	tien	dian	tuan	duan
shou	shou	t'ien	tian	t'uan	tuan
shu	shu	ting	ding	tui	duei
shua	shua	t'ing	ting	t'ui	tuei
shuai	shuai	tiu	diou	tun	duen
shuan	shuan	to	duo	t'un	tuen
shuang	shuang	t'o	tuo	tung	dong
shui	shuei	tou	dou	t'ung	tong
shun	shuen	t'ou	tou	tzû	tzy
shuo	shuo	tsa	tza	tz'û	tsy
so	suo	ts'a	tsa		
sou	sou	tsai	tzai	wa	ua
ssû (szû)	sy	ts'ai	tsai	wai	uai
su	su	tsan	tzan	wan	uan
suan	suan	ts'an	tsan	wang	uang
sui	suei	tsang	tzang	wei	uei
sun	suen	ts'ang	tsang	wên	uen
sung	song	tsao	tzau	wêng	ueng
szû (ssû)	sy	ts'ao	tsau	wo	uo
		tsê	tze	wu	u
ta	da	ts'ê	tse	ya	ia
t'a	ta	tsei	tzei	yai	iai
tai	dai	tsên	tzen	yang	iang
t'ai	tai	ts'ên	tsen	yao	iau
tan	dan	tsêng	tzeng	yeh	ie
t'an	tan	ts'êng	tseng	yen	ian
tang	dang	tso	tzuo	yin	in
t'ang	tang	ts'o	tsuo	ying	ing
tao	dau	tsou	tzou	yu	iou
t'ao	tau	ts'ou	tsou	yung	iong
tê	de	tsu	tzu	yü	iu
t'ê	te	ts'u	tsu	yüan	üan
tei	dei	tsuan	tzuan	yüeh	iue
t'ei	tei <sup>1</sup>	ts'uan	tsuan	yün	iun
têng	deng	tsui	tzuei		
t'êng	teng	ts'ui	tsuei		

<sup>1</sup> Cf. p. 481, n. 2.

## C. RULES FOR THE ORTHOGRAPHIC CHANGES OF THE BASIC FORM

Reprinted from Simon, W., *The New Official Chinese Latin Script*  
(A. Probsthain, London, 1942).

## I FIRST TONE

- 1 Use basic form : *hau, ta*.
- 2 Insert *h* after *l, m, n, r* when these are initial : *lha, rheng*.

## II SECOND TONE

- 1 Use basic form when *l, m, n, r* are initial : *lai, mang, nu, ren*.
- 2 In other words add (or insert) *r* : *char, baur, parng*.
- 3 Note the following special cases :—
  - (a) Change *i* to *y* and *u* to *w* when initial or medial : *yang, wan, tyau, hwei*.
  - (b) Insert *y* or *w* when the word ends in the single vowels *i* or *u*, and prefix these to *i* and *u* as words : *dyi, chwu ; yi, wu*.
  - (c) Change *i* to *y* in words ending in *-in* and *-ing* (including *in* and *ing* as words) ; *pyn, shyng ; yn, yng*.

## III THIRD TONE

- 1 (a) In words with one vowel only double this : *bii, maan, leeng*.  
(b) Note that as words *i, in, ing* and *u* become *yii, yiin, yying* and *uuu*.
- 2 (a) In words ending in *ei, ie, ou* and *uo* double *e* or *o* : *bee, shiee, koou, huoo*.  
(b) Note that as words *ie* and *uo* become *yee* and *woo*.
- 3 (a) Change *i* to *e* and *u* to *o* when medial or final (as last part of a diphthong) : *jea, dean ; bae, hao*.  
(b) In the case of initial *i* and *u* prefix in addition *y* or *w* : *yeen, yeu ; woei, woan*.  
(c) Note, however, the different treatment of the diphthongs *ei, ie, ou, uo* (III, 2a and 2b).

## IV FOURTH TONE

- 1 (a) Add *h* at the end of the word : *lah, guoh*.  
(b) In addition change initial *i* to *y* and *u* to *w*, and prefix *y* and *w* to *i* and *u* as words : *yeh, wah ; yih, wuh*.
- 2 Note the following special cases.
  - (a) Double *n* and *l* and change *ng* to *nq* (initial *i* and *u* to be changed as before, *y* to be prefixed to *in* and *ing* as words) : *ann, ell, jenq ; yann, wann, yonq, wang ; yinn, yinq*.
  - (b) Change final *i* to *y* and *u* to *w* when they form the last part of diphthongs or triphthongs (initial *i* and *u* to be changed as before) : *day, kuay, low, diaw ; yaw, way*. But add *h* to *iu* as ending or as a word : *chiuh, yuh*.

## Appendix IV

### MAPS AND CHARTS

#### INTRODUCTION

Long before the coming of Europeans the Chinese had been making maps of their own country. The earliest known of these maps of China were discovered in the 'Forest of Tablets' at Sian; the two oldest (A.D. 1137) are stone engravings from which rubbings were made. Records refer to maps as early as 227 B.C. and the data from which these engravings were compiled probably go back to the third century A.D.

The precise cartography of China began with the Jesuits in the seventeenth century. The emperor K'ang Hsi (see p. 355) entrusted them with the survey of various districts and provinces as well as of China as a whole; these maps were for long the chief basis of the knowledge possessed by the outside world about the topography of China. Indeed many later maps contain material which can be traced back to the exquisite copper-plate maps of the Jesuit cartographers. The *Atlas de la Chine*, which had forty-two copper-plate general and provincial maps, compiled in 1737 by the Frenchman D'Anville, was evidently based on these Jesuit maps.

During the second half of the nineteenth century, when China was opened up to the nations of the west, an increasing number of maps appeared; the majority of these were based on the reports of missionaries and on the journeys of explorers and other travellers. Scientific expeditions and road and railway surveys added further information, while details of the more accessible coastal areas soon became available. At the beginning of the present century, various foreign authorities began to issue official maps of China. The French and German War Offices were early in the field, and were soon followed by G.S.G.S. and by the Survey of India; the Japanese, naturally, were also interested, especially in Manchuria and North China.

Few of these foreign series were based on actual surveys, for there was little in the nature of precise data apart, for example, from: (i) the G.S.G.S. surveys, based to some extent on aerial photographs; (ii) surveys by drainage authorities (such as the North China River Commission); (iii) coast and river charts; (iv) engineers' surveys; and (v) scattered astronomical locations. Much work has been done in recent years by the Chinese Geological Survey, but there is a very urgent need for a triangulation network and for an official and comprehensive survey programme.

Organizations such as the China Inland Mission, the Directorate-General of Posts, the Chinese Maritime Customs and the China Continuation Committee have all played a part in the mapping of China. Important contributions, too, have been made by publishing firms, both Chinese and non-Chinese (see p. 503).

#### DESCRIPTION OF MAPS

The maps of China are so numerous and so varied in every respect that it has been found neither possible nor convenient to describe all of them. Special attention has been given to the most useful of those which are easily

accessible to the readers of this handbook. The selection is described in the following order :

- A. Chinese General Staff maps.
- B. Maps issued by the Geographical Section of the British General Staff.
- C. Official maps issued by other countries.
- D. Charts.
- E. Geological maps.
- F. Miscellaneous maps.
- G. Atlases.

In each group the maps are listed usually in order of scale, those on a large scale coming first. The following particulars are given where possible for each series :—

- (1) Authority responsible for its production.
- (2) Date of production, with subsequent revisions.
- (3) Number of sheets in the series.
- (4) Size of sheets, measured to the margin of the area mapped.
- (5) Projection.
- (6) Meridian of origin (if not from Greenwich) and grid or graticule.
- (7) Scale.
- (8) Marginal information.
- (9) Whether coloured or in black.
- (10) Method of representation of relief.
- (11) Details of roads, railways and other information.

### A. CHINESE GENERAL STAFF MAPS

Chinese General Staff maps are of recent date and many are difficult to procure ; the fact that they are for the most part entirely in Chinese further restricts their usefulness to western readers. *Symbols used on Chinese General Staff Maps*, published by the War Department, Army Map Service, Corps of Engineers, U.S. Army (Washington, D.C., 1943), is of great help in reading Chinese General Staff maps.

#### (1) 1 : 300,000 China

This series will eventually cover the whole of China, in sheets each 11 by 18½ in. (314 published at intervals between 1931 and 1943).

Relief by contours. Roads, railways, settlements and minor features are also shown. No details as to colour available (photostat copy).

In addition to district and provincial series on scales of 1 : 25,000 and 1 : 50,000, there are some 2,800 sheets of provinces on a scale of 1 : 100,000, varying enormously in accuracy. Provincial series include :

#### (2) 1 : 100,000 Kwangtung

Kwangtung is covered by 198 sheets, each 20¼ × 24 in., published by the Chinese General Staff at intervals since 1931, and representative of the series on this scale. No grid or graticule, scale in metres.

Relief by contours at 50 m. interval. Roads, railways, rivers, towns (four grades), and minor features are also shown. No details as to colour available (photostat copy). The China Unit, U.S. Army Map Service, has issued (1943) transparencies with English transliterations for use with this series.

## (3) 1 : 100,000 Chekiang

Another type of provincial series, published (1930) in 118 sheets, each 11 × 19 in. In black and white throughout.

Relief by contours at 50 m. intervals, some intermediate form-lines at 25 m. intervals, spot heights in black in metres. Roads, railways, water features, settlements, vegetation (coniferous and deciduous trees), and land use symbols also in black. Chinese only is used in this series.

## (4) 1 : 200,000 Kiangsi

Twenty-seven sheets of this series are available. In general details as for Kwangtung series (No. 2), but some place names transliterated.

## (5) 1 : 1,600,000 Yunnan-Kweichow and Szechwan

Single sheets for each of these south-western areas. Graticule every 1° longitude and latitude, scale in km.

Relief by hachures in Yunnan-Kweichow sheet, no representation on Szechwan sheet. Roads, railways, rivers, boundaries and towns (five grades), all in black, are also shown.

B. MAPS ISSUED BY THE GEOGRAPHICAL SECTION OF THE  
BRITISH GENERAL STAFF

## (6) 1 : 20,000 G.S.G.S. Series 3868, Hong Kong and New Territory

Published in 1929, reprinted with minor corrections in 1940. The series consists of twenty-four sheets, each  $29\frac{1}{2} \times 19\frac{3}{4}$  in. Kilometre grid, with latitude and longitude in each corner. Scale in yards and metres.

Relief is shown by contours in brown, at 10 m. intervals, every 50 m. accentuated, and by black spot-heights in metres. Roads by double black lines (three grades, 1st class filled brown), cart tracks and paths (two grades); railways (two grades) in black. Rivers, lakes and ditches in blue; sea in two shades of blue, fathom lines pecked in blue, at 1, 3, 6 and 10 fm., with occasional blue spot-depths in fm. Vegetation in green (three types). Special symbols in blue for marsh, mangroves, salt pans and irrigated land, in black for telegraph, telephone and power transmission lines, in brown for sand, mud, stones and boulders. Boundaries in black, settlements in lined black, isolated houses in solid black. Numerous special symbols in black for other minor features.

## (7) 1 : 25,000 G.S.G.S. Series 3831, Canton, Hankow and Nanking

Three sheets, each  $31\frac{1}{2} \times 23\frac{1}{2}$  in., published in 1927 and revised in 1937, covering the three areas named. Kilometre grid with latitude and longitude at corners. Scale in yards and metres.

Relief by brown contours every 10 m. (5 m. for Hankow), every 50 m. accentuated (every 25 m. for Hankow), with black spot-heights in metres. Roads, tracks and paths in black (Nanking and Canton), in brown (Canton) and in red (Hankow), with special symbol for raised paths; railways in black. Water features, marsh and ricefields in blue, river-bed contours in



blue with different intervals for each map. Vegetation features in black symbols. Boundaries, telegraph and telephone lines, settlements, houses and other minor features in black.

(8) 1 : 31,680 G.S.G.S. Series 1430, Wei-hai-wei

Published in 1927, based on an 1899 map, in four sheets each  $32 \times 24$  in. Kilometre grid, margin divided into 1-minute intervals longitude and latitude. Scale in miles and yards.

Relief by brown form-lines every 100 m. with brown spot-heights in metres. Rivers in blue. Soundings in fm. in Wei-hai-wei Bay. Some black vegetation symbols. Settlements in lined or solid black.

(9) 1 : 50,000 G.S.G.S. Series 3871, Bias Bay East

Single sheet, measuring  $33\frac{3}{4} \times 26\frac{3}{4}$  in., published in 1929. Kilometre grid, scale in yards and metres.

Relief by brown contours at 20 m. intervals, every 100 m. accentuated, with spot-heights in black in metres. Roads and paths in black (special symbol for raised paths). Rivers, marsh and paddy fields in blue; sea in blue-green, with blue pecked submarine contours at 1, 3, 6 and 10 fm. Brown symbols for sand, stones and mud. Vegetation (three types) in black. Black symbols for telegraph lines, settlements, and walls.

(10) 1 : 50,000 G.S.G.S. Series 3789, Eastern China

Published in 1926, 2nd and 3rd revised editions of some sheets in 1942. Four sheets of different sizes, Peking, Tungchow, Shanhaikuan, Shanghai. Kilometre grid with latitude and longitude at corners. Scale in yards and metres.

Relief, where data available, by brown contours at 5-minute intervals (every 25 m. accentuated) up to 100 m., and at 25 m. intervals above 100 m.; brown pecked form-lines of various heights at hill tops. Roads and tracks (three grades) in black, first class filled brown; railways and tramways (three grades) in black, with distances in km. Rivers, marsh and ricefields in blue. Boundaries, settlements, telegraph lines and other features in black. Sand in brown or black stipple. Shanhaikuan sheet has 20 m. contour intervals, with brown pecked form-lines at 10, 30 and 50 m.; also blue pecked submarine contours at 1, 3 and 6 fm.

(11) 1 : 50,000 G.S.G.S. Series 3789a, Chihli Province (Hopeh)

Compiled from a Chihli River Commission survey (No. (56)) and published at intervals between 1927 and 1934. Sixteen sheets, each  $33\frac{3}{4} \times 21\frac{3}{4}$  in., with names in Chinese as well as English. Kilometre grid, with latitude and longitude at each corner; polyconic projection. Mean scale for longitude, scale for latitude in li, miles and km.

Relief in brown contours (some sheets black) by 0.5 m. up to 50 m., by 1 m. from 50 m. to 60 m., by 2.5 m. from 60 m. to 100 m., by 10 m. from 100 m. to 150 m., by 25 m. from 150 m. up; spot-heights in brown (some sheets black) in metres. Elevations from Taku datum, 1.3 m. below mean sea level. Railways, roads and tracks in black. Rivers, springs and other water features in blue; some submarine contours in brown above l.w.m., in

blue below l.w.m., at 0.5 m. intervals. Sands, dunes, and dykes by brown symbols. Boundaries, settlements, and other special symbols for minor features in black (including structure of bridges).

(12) 1 : 63,360 G.S.G.S. Series 2400, Ching-wang-tao and Pei-tai-ho

Published in 1907, revised in 1937, in two sheets each  $20\frac{1}{4} \times 14\frac{1}{2}$  in. (the fully mapped area does not cover the sheet). Kilometre grid, longitude and latitude at each corner. Scale in miles.

Relief by brown form-lines at 30 ft. intervals. Railways (two grades) and roads in black. Water features in black, with black pecked submarine contours at 1, 2, 3 and 5 fm. only near ports. Black symbols for telegraph lines, settlements, woods and sand-hills. Information on nature of coast, cultivation, and structure of bridges given on map.

(13) 1 : 80,000 G.S.G.S. Series 3961, Hong Kong and the New Territories

Reduced from the 1 : 20,000 Series 3868 (No. (6)), published 1936 and revised 1938 ; single sheet  $34\frac{1}{2} \times 24\frac{1}{2}$  in. Kilometre grid. Longitude and latitude at each corner ; margin divided into 10-minute intervals longitude and latitude. Scale in miles and km.

Relief by brown contours at 50 m. intervals, every 250 m. accentuated with black spot-heights in metres. Railways and tramways in black, roads and tracks (five grades) in black, motor roads brown filled. Rivers, sea, lakes, marsh, mangroves and irrigated lands in blue ; blue submarine contours at 1, 3, 6, and 10 fm. Sand, mud, stones and boulders in brown. Telegraph lines, settlements, boundaries and symbols for other minor features in black.

(14) 1 : 250,000 G.S.G.S. Series 3825

This series covers the following six areas on one sheet each.—Shanhaikuan, Peking-Tientsin, Shanghai-Hangchow, Nanking, Swatow, Hong Kong-Canton. Published in 1927, second editions of some sheets in 1934, further revisions in 1938. Ten kilometre grid, longitude and latitude at each corner. Scale in miles and km.

Relief by brown contours or form-lines at 100-m. intervals (Peking-Tientsin sheet has 10 m. to 100 m., then 50 m. intervals), and black spot-heights in metres. Roads in black, brown or red according to the sheet ; railways in black (two or three grades). Water features blue, including submarine contours at 1, 3, 6 fm. Brown stipple for sands and mud. Telegraph lines in black. Settlements solid and lined black ; other symbols in black varying from one sheet to another.

(15) 1 : 500,000 G.S.G.S. Series 3849-3850, Yangtze River

Published in 1927 in two sheets, each  $18\frac{1}{4}$  and  $20\frac{1}{4}$  in., covering Taipingfu to Kiukiang, and Kiukiang to Hankow. Graticule at  $1^\circ$  intervals of longitude and latitude, margin divided at 5-minute intervals longitude and latitude.

Relief by black hachures ; water features in blue. Towns (four grades) in black. Railways, roads, tracks, telegraph lines, and minor features in black.

## (16) 1 : 500,000 G.S.G.S. Series 4222, East Central Asia

Published in 1941 and based on a locally produced series of 1929-30. In eighteen sheets, each  $13\frac{1}{4} \times 19\frac{1}{2}$  in., covering Kiangsu, Ankwei, Hupeh, Chekiang, Kiangsi and parts of adjoining provinces. Graticule every  $1^\circ$  longitude, every 15 minutes latitude, margin divided into 15-minute intervals longitude, 5-minute intervals latitude. Scale in miles and km.

Relief by brown stipple with some unspecified brown form-lines to represent hills; no indication of exact heights. Railways (two grades) in black; roads and paths (three grades) in red. Water features in blue, sand by brown stipple. Telegraph lines in red and in black. Black vegetation symbols. Settlements and various other minor features in black.

## (17) 1 : 506,880 G.S.G.S. Series 1913, Chihli Province beyond the Great Wall

This series, published in 1905, consists of nine sheets, each  $25\frac{3}{4} \times 18\frac{3}{4}$  in. Graticule every  $1^\circ$  longitude and latitude. Scale in miles and km.

No representation of relief beyond spot-heights in black. Blue for lakes, sea and lower reaches of rivers. Roads (three grades), railways and settlements (three grades) in black; various other minor features in black. Some sheets have town plan insets.

## (18) 1 : 1,000,000 G.S.G.S. Series 2048, Ssü-Ch'uan East

Single sheet,  $30 \times 17$  in., published in 1908. Graticule every  $1^\circ$  longitude and latitude, margin divided into 5-minute intervals longitude and latitude.

No representation of relief except spot-heights in black. Towns and villages (six grades) in red; roads in red, telegraph lines in black. Water features in blue. Provincial boundaries in green. Other symbols in black, including tribal names. Glossary in sheet margin.

## (19) 1 : 1,000,000 G.S.G.S. Series 3996, Chekiang, Fukien, Kwangtung

Three sheets of different sizes, published in 1939-40. Graticule every  $1^\circ$  longitude and latitude, margins divided at 5-minute intervals longitude and latitude. Modified polyconic projection. Scale in miles and km.

Relief by brown contours (green, Fukien sheet) at 100 m., 200 m., 500 m., and by 500 m. to 3,000 m., then by 1,000 m. (Fukien and Kwangtung sheets have layer-colouring in shades of green and brown); black spot-heights in metres. Railways (three grades) in black, roads (three grades) in red, telegraph and telephone lines in red. Rivers, swamp or marsh, and areas liable to inundation, in blue; sand in black or brown stipple. Boundaries, settlements (five grades) and minor features in black (submarine cable on Fukien sheet).

Second edition Army/Air style of Kwangtung sheet published in 1942 as for first edition, but with layer-colouring in shades of purple, roads and telegraph lines in red-brown, additional scale in nautical miles, conversion table (metres to feet), magnetic declination and local mean time superimposed in blue.

## (20) 1 : 1,000,000 G.S.G.S. Series 2555, Asia

Sheets in this series are now available to cover the greater part of China ; they vary considerably, though most of them are reproductions from the Survey of India 1/M Series (No. (40)). The Peking (North J-50) and Jehol (North K-50) sheets conform most nearly to the standards of the International Map. Each sheet, measuring  $20 \times 17\frac{1}{2}$  in., was published in 1937. Graticule every  $1^\circ$  longitude and latitude, margin divided at 5-minute intervals longitude and latitude. Modified polyconic projection, scale in miles and km.

Relief by contours at 100 m., 200 m., 500 m., and by 500 m. to 3,000 m., with layer-colouring in shades of green and brown ; spot-heights in black, in metres. Roads (three grades) in red, railways (three grades) in black. Water features in blue, including swamp and area liable to flooding ; brown stipple for sand, telegraph lines in red, boundaries and minor features in black, towns (five grades) by black symbols.

Sheets from the Survey of India 1/M Series were published in 1942-44. The graticule throughout is divided into 5-minute intervals, while there is an additional scale in nautical miles. Contours generally in brown (Canton sheet is entirely in black), at varying intervals, generally at 150 m. to 600 m. and by 300 m. to 3,000 m., but some sheets are similar to North J-50 (Peking). No layer-colouring, but spot-heights in feet and metres. Brown form-lines for prominent under-features on some sheets ; black stipple for sand. Boundaries in black, some sheets overlaid purple. Reference in French as well as English ; some sheets with a glossary.

The Survey of India sheets are also published in Army/Air style (first, second and/or third editions, 1942-44), as above but with layer-colouring in shades of purple. Roads and telegraph lines in red-brown, conversion table (metres to feet), magnetic declination and local mean time superimposed in blue.

## (21) 1 : 1,126,720 G.S.G.S. Series 2112, Yunnan

Single sheet published 1906, corrected 1908. Graticule every  $1^\circ$  longitude and latitude, with margin divided at intervals of 5 minutes longitude and latitude. Scale in miles and km.

Relief by brown hill-shading, with black spot-heights. Roads (three grades) in red, railways in black. Water features in blue, telegraph lines and boundaries in black (boundary of Yunnan overlaid green). Towns (four grades) in black, minor features also black, with tribal names overprinted in red.

## (22) 1 : 2,000,000 G.S.G.S. Series 3839, China

Four sheets (NE, NW, SE, SW), published in 1927, each  $21\frac{1}{2} \times 27\frac{1}{2}$  in. Graticule every  $2^\circ$  longitude and latitude. Scale in miles and km.

Relief by brown contours at 500 m., 1,500 m. and 3,000 m., with layer-colouring in three shades of brown. Railways, rivers and boundaries in black. Towns (four grades) in black, treaty ports underlined.

## (23) 1 : 4,000,000 G.S.G.S. Series 2957, Asia

China (sheet No. 34) practically covers China Proper ; some small areas on Mongolia (sheet No. 22) and Malay Peninsula (sheet No. 46). Published

in 1926, second edition in 1939. Conical orthomorphic projection with two standard parallels. Graticule every  $2^{\circ}$  longitude and latitude, with marginal interval every 10 minutes longitude and latitude. Scale in miles and km.

Relief by brown contours at 200 m., 500 m., by 500 m. to 3,000 m., and by 1,000 m. to 7,000 m., with layer-colouring in shades of brown and green, and spot-heights in black in metres. Railways (including those under construction) in black, roads in black (three grades), main roads filled red-brown. Rivers and other water features in blue. Towns (five grades) by black symbols, boundaries in black (international boundaries overlaid purple). Line of perpetual snow by blue dot and dash.

(24) 1 : 5,000,000 G.S.G.S. Series 4049, Railway Map of China

This single sheet was published in 1939. Conical orthomorphic projection, graticule every  $4^{\circ}$  latitude and longitude, scale in miles and km.

No representation of relief. Railways in red (pecked line for those under construction and indication of where lines have been destroyed). Boundaries in black, rivers in blue, and towns (three grades) by black symbols.

(25) 1 : 6,500,000 G.S.G.S. Series 4065, Japan, Korea and adjoining territories

Published in 1939, a single sheet which covers most of China, except the far west. Conical orthomorphic projection, graticule every  $4^{\circ}$  longitude and latitude, latitude scale in miles.

Black and white map with blue sea and lakes, shows boundaries, railways, rivers, and important towns in black ; no representation of relief.

(26) 1 : 8,000,000 G.S.G.S. Series 4304, China and Japan

Published in 1942, compiled from G.S.G.S. Series 4065 (No. (25)) and 2957 (No. (23)). Conical orthomorphic projection, graticule every  $2^{\circ}$  longitude and latitude, with marginal intervals  $1^{\circ}$  longitude and latitude. Latitude scale in miles.

Relief by brown contours at 1,000 m., 2,000 m., 3,000 m., 5,000 m. and 7,000 m., with layer-colouring in green and in shades of brown.

### *Town Plans*

(27) 1 : 5,000 G.S.G.S. Series 3843, Chefoo

Single sheet published in 1927, names in Chinese and English. In black and white, no representation of relief. Scale in yards.

(28) 1 : 5,000 G.S.G.S. Series 3844, Amoy

Single sheet published in 1927, names in English only. In black and white, with black form-lines and spot-heights ; scale in yards and metres.

(29) 1 : 10,000 G.S.G.S. Series 3890, Victoria

Single sheet  $27\frac{1}{2} \times 19\frac{1}{2}$  in., published in 1930, revised 1931. Kilometre grid, with longitude and latitude at each corner, scale in yards and metres.

Relief by brown contours at 10 m. intervals, every 50 m. accentuated, brown hill-shading and black spot-heights in metres. Railways (two grades) in grey, roads by double black lines (footpaths pecked lines). Trees (coniferous and deciduous) by grey symbols. Water features in blue, with blue pecked fathom-lines at 1, 3, 6, 10 fm. and blue layer-colouring. Brown stipple for sands and mud. Buildings, lined red private property, solid red Government property.

(30) 1 : 15,840 G.S.G.S. Series 3956, Shanghai

Two overlapping sheets of different sizes, compiled from the Municipal Plan of 1933, published 1935 ; reprinted 1937 with slightly different grid. Kilometre grid, scale in yards, metres, and miles.

No representation of relief ; railways in black, roads and paths (three grades) double pecked lines (motor roads filled orange). Water features in blue ; parks, cemeteries, etc., in green ; marsh by black symbols. Village and built-up areas lined black, important buildings solid black. Settlement boundaries lined orange.

(31) 1 : 12,500 G.S.G.S. Series 3959, Tientsin

Published in 1935 with kilometre grid and scale in yards and metres. In black and white with water in blue ; no representation of relief : railways in black. Concessions overprinted blue.

## C. OFFICIAL MAPS ISSUED BY OTHER COUNTRIES

### *F.M.S. Official Maps*

(32) 1 : 1,613,245, Asia

This series was published by the Surveyor-General, Survey Department, Federated Malay States and Straits Settlements at Kuala Lumpur in 1941. Sheets 3, 4, 10, 11, 17 and small portions of other sheets cover China.

### *French Official Maps*

The *Service géographique de l'Indochine* has published maps which cover the French leased territory of Kwangchow wan, but this organization and the *Service géographique de l'Armée* have also issued series for Chinese territory.

(33) 1 : 25,000, *Carte du Territoire de Quang-Tchéou*

Published in 1901 by the *Service géographique de l'Indochine*. Comprises twelve sheets in colour (some revised in 1931, 1936-8), each 8 × 10 in. Scale in miles and km.

(34) 1 : 100,000, *Kouang-Tchéou-Wan*

Published in 1908 by the same authority as above, in two sheets, each 19½ × 14¾ in. Graticule every 20 minutes latitude and longitude (from

Paris), margin divided at 2-minute intervals latitude and longitude. Scale in km. Coloured map with exhaustive key. This is part of the 1 : 100,000 *Carte de l'Indochine*.

(35) 1 : 500,000, *Province de Kouei-Tchéou*

Published in 1919 by the same authority.

(36) 1 : 1,000,000, *Asie Orientale*

Published by the *Service géographique de l'Armée*, 1899-1909. Ten sheets cover part only of China.

Relief by grey hill-shading, roads in red, railways in black. Water features in blue, with submarine contours.

(37) 1 : 2,000,000, *Carte de la Chine Orientale*

Nine sheets, published in 1908 by the *Service géographique de l'Indochine*, each  $18\frac{1}{2} \times 22\frac{1}{2}$  in. Graticule every  $2^\circ$  longitude and  $1^\circ$  latitude (from Paris and Greenwich). Scale in km.

Relief by grey hill-shading. Railways in red, roads in black. Rivers and water features in blue, with submarine contours at 50 m., 100 m., 1,000 m., 2,000 m., 3,000 m. Sand areas in brown stipple, boundaries in pink, settlements in black, most important named in red.

### *German Official Maps*

Germany was one of the earliest countries to issue series covering parts of China, in particular of the areas surrounding the former German-based territory of Kiaochow. The following are worth noting :

(38) 1 : 200,000, *Karte von Tschili und Shantung*

Published 1907-9 by the *Kartographische Abteilung der Königl. Preussischen Landesaufnahme* (Berlin), in sixty-three sheets, each  $14\frac{1}{2} \times 16$  in. Conical projection and no grid or graticule but margins divided into 10-minute intervals longitude and latitude (from Tientsin). Scale in li and km.

Relief by heavy brown hill-shading, with spot-heights in black in metres. Railways in black, roads (three grades) by double black lines. Water features in blue, with submarine contours at 6 m., 10 m. and 20 m. Telegraph lines, provincial boundaries and minor features in black. Overprint of Chinese place-names in purple, settlements in red.

(39) 1 : 1,000,000, *Karte von Ost-China*

Published 1901-12 by the same authority as above in twenty-two sheets, each  $6^\circ$  longitude by  $4^\circ$  latitude. Graticule every  $1^\circ$  latitude and longitude, margins divided at 10-minute intervals longitude and latitude. Scale in miles, km. and nautical miles.

Relief by brown hill-shading, with spot-heights in black in metres. Roads (two grades) in red, railways (three grades) in black. Rivers, etc., in blue. Towns (eight grades) by black symbols. Provincial boundaries in green. Minor features in black and red.

*Survey of India*

The Survey of India has extended its surveys to cover parts of China. Particularly useful for western China is the following :

## (40) 1 : 1,000,000, India and adjacent countries

Certain sheets of this series in different styles cover western China, published at various dates since 1921 ; the sheets cover  $4^{\circ}$  latitude by  $6^{\circ}$  longitude. Modified polyconic projection, graticule over  $1^{\circ}$  latitude and longitude, margins divided every 10 minutes latitude and longitude. Scale in miles only, or on some sheets in miles and km.

Yunnanfu sheet has relief by brown contours at 2,000 ft., by 500 ft. to 4,000 ft., 5,000 ft., 6,000 ft., 8,000 ft., 10,000 ft. and by 2,500 ft. to 20,000 ft., with layer-colouring in shades of yellow and red-brown, and grey oblique hill-shading ; spot-heights in feet in black. Water features in blue, including glaciers ; area above snow-line in white. Roads in red (two grades), railways in black (eight grades), boundaries in black, towns in red and black (five grades). Telegraph lines, tribal names and minor features in black.

Kiatingfu (Loshan) sheet has relief by brown contours and form-lines at 1,000 ft. intervals, no layer-colouring or hill-shading. Rivers in black, or double black lines filled blue, roads (five grades) in black, towns in black only. Post and telegraph offices indicated.

*Japanese Official Maps*

These include the following :

## (41) 1 : 200,000, China

Published by the Japanese Land Survey at various dates between 1907-37.

## (42) 1 : 500,000, Naval Air Charts

Published in 1940. Reproduced by Army Map Service, U.S. Army (see No. (46)).

## (43) 1 : 1,000,000, China

Nine sheets, each  $26\frac{1}{2} \times 38\frac{1}{2}$  in., published by the Japanese Land Survey in 1937-9. Modified polyconic projection. Graticule every  $1^{\circ}$  longitude and latitude. Scale in km.

Relief by brown contours at 200 m., 500 m., and by 500 m. upwards. Spot-heights in black in metres. Railways (three grades), roads (two grades) and sea-routes in black. Coastline and water features in blue. Towns (five grades) in black symbols. Numerous minor features by black symbols. A large number of place-names with English transliterations.

## (44) 1 : 2,500,000, China, Manchuria and adjoining territories

Four sheets, each  $26\frac{1}{2} \times 34\frac{1}{2}$  in., published by the Japanese Land Survey in 1936. Graticule every  $2^{\circ}$  longitude and latitude, margin divided at 20-minute intervals longitude and latitude. Scale in km.



Relief by brown hill-shading and black spot-heights in metres. Railways (three grades), roads and sea routes in black. Water features in blue. Towns (ten grades) and minor features by black symbols. Boundaries overlaid green. A few English transliterations, but predominantly Japanese place-names.

### *Portuguese Official Maps*

See *Atlas de Macau* (No. (82)).

### *U.S. Official Maps*

These have mostly been produced since 1939 in response to war needs and include the following :

#### (45) 1 : 500,000, Aeronautical Charts

Sheets for coastal areas, on twice the scale, but otherwise differing little from No. (47). Some sheets have contours in brown and roads in pale purple, others no contours but hachures in pale purple.

#### (46) 1 : 500,000, Naval Air Charts

Six sheets (Nos. 30, 37, 38, 39, 40, 41) of this series cover the coast of China from Shantung to Swatow. The series as a whole covers the coasts of Japan and neighbouring countries and was reproduced by the War Department Map Collection, O.C.E., U.S. Army (Washington, D.C.) from the Japanese Naval Air Charts on the same scale, in 1940.

#### (47) 1 : 1,000,000, Aeronautical Charts

Similar in purpose to the G.S.G.S. Army/Air style, this comprehensively planned series (1,818 sheets for the whole world) covers China in about twenty sheets, each  $27 \times 19\frac{1}{2}$  in. Published at Washington, D.C., in 1942 by the Army Map Service, U.S. Army. The area fully mapped on each sheet covers  $4^\circ$  latitude by  $6^\circ$ – $8^\circ$  longitude and does not stretch to the margins, leaving an overlap on all sides from one sheet to another. Lambert conformal conic projection ; graticule every 15 minutes longitude and latitude, every degree line subdivided at 1-minute intervals. Scale of miles on map margin, scale in miles, nautical miles and km. on reverse side of sheet which, as well as a detailed legend, contains a location index of the sheet, an index of the whole series, and a list of source authorities.

Relief by contours in pale purple at 1,000 ft. intervals, every 5,000 ft. accentuated. Spot-heights in black in ft., purple hachures for peaks and ridges, form-lines by broken light purple lines. Roads (three grades) in brown, railways in black. Rivers, swamps, tidal- and mud-flats and water features generally in blue. Boundaries, towns (five grades) and minor features in black. Detailed aeronautical information overprinted in purple-blue.

#### (48) 1 : 1,000,000, Burma-Yunnan Borderlands

Published at Washington, D.C., in 1941, by the Army War College, U.S. Army.

## (49) 1 : 1,000,000, Eastern Asia

The sheets of this series covering China—in course of publication (1944) by the same authority as No. (50)—are largely reproduction of 1/M series Nos. (20) and (40), with communications revised to 1943, aeronautical data added, and certain minor alterations.

## (50) 1 : 2,000,000, Asia, Transportation Map

Four sheets (NW, NE, SW, SE), each  $30 \times 28\frac{1}{2}$  in., covering China and adjoining territories. Published at Washington, D.C., by the Army Map Service, U.S. Army, in 1943. Lambert conformal projection, graticule every  $2^\circ$  latitude and longitude. Scale in miles (varying every  $2'$  latitude).

No representation of relief; passes in red. Roads and trails (five grades) in red, railways (sixteen grades) in black. Rivers, lakes, canals and sea in blue. National and provincial boundaries and the Great Wall in black. Towns (four grades) in red. Names in English, romanization according to U.S. Board of Geographical Names, 1943.

## (51) 1 : 3,000,000, World

Sheet 27, Yellow Sea, drawn on Mercator's projection, covers most of China Proper. Published in 1942 by the same authority as No. (50).

## (52) 1 : 4,000,000, Eastern Hemisphere

This series is a reproduction of G.S.G.S. Series 2957 (No. (23)) by the same authority as No. (50) in 1942. Sheet 34 covers China.

## (52A) 1 : 4,000,000, China, Special Strategic Map

Single sheet covering from  $20^\circ$  to  $40^\circ$  N latitude and from  $96^\circ$  to  $123^\circ$  E longitude. Published in 1943 (2nd edition, 1944) by the same authority as No. (50). Lambert conformal conic projection, graticule every 2 degrees latitude and longitude. Scale in miles and km.

Relief by hachures in brown, some spot-heights in black in metres. Roads and trails (three grades) in red, railways (six grades) in black; railways destroyed and under construction also indicated. Rivers, lakes, canals and sea in blue, post-1938 course of the Hwang ho shown. Towns (three grades) in black; international boundaries black pecked line overlaid pink.

## D. CHARTS

*British Admiralty Charts*

The basis of these charts was a series of charts published in the first half of the nineteenth century for the East India Company by its own hydrographers, of whom James Horsburgh is the best known. A key to the modern series of charts published by the British Admiralty will be found at the beginning of: (i) *China Sea Pilot*, vols. I and III (London, 1938); and (ii) the *Yangtze Kiang Pilot* (London, 1928). A full list of the charts is given in the *Catalogue of Admiralty Charts and other Hydrographic Publications, 1943* (London, 1943). It should be noted that a number of new revisions of charts have been issued since the dates of publication and are noted in the *Supplements relating to the Pilots*.

### Chinese Charts

These include charts compiled by the Hydrographic Department of the Chinese Navy from its own surveys and also charts published by the Marine department of the Chinese Maritime Customs. Both series, but more particularly the former, have titles, place-names, notes, etc., in Chinese as well as in English. The Chinese Admiralty Charts are mainly from recent surveys.

### U.S. Charts

Index plans to the charts of the China area published by the U.S. Navy Department, Hydrographic Office (Washington), will be found at the beginning of the following *Sailing Directions* : (i) No. 124 *Asiatic Pilot*, vol. iii, *Coast of China, Yalu River to Hong Kong entrance, and Island of Taiwan (Formosa)* (1942) ; and (ii) No. 125 *Western shores of China Seas from Singapore Strait to and including Hong Kong* (1937). Full details will be obtained in the *General Catalogue of Mariners' Charts and Books*, and information as to the corrections and additions in the *Supplements to the Sailing Directions and Notices to Mariners*.

### French Charts

These are issued by the *Service Hydrographique de la Marine* (Paris), which published a full list in its *Catalogue des Cartes, Plans et Ouvrages*. Index plans will be found at the beginning of the following *Instructions Nautiques* : (i) No. 361, *Mer de Chine*, vol. i (1933) ; (ii) No. 362, *Mer de Chine*, vol. ii (1933) ; (iii) No. 328, *Mer Jaune et golfe du Petchili* (1936). Detail of corrections and additions are to be found in the annual *Fascicule des Corrections* and the *Avis aux Navigateurs*.

## E. GEOLOGICAL MAPS

There is no large-scale geological map series of China, though the Geological Survey of China have carried out an immense amount of field work in recent years, publishing numerous maps of special areas in the *Memoirs and Bulletin of the Geological Survey of China*. Similar maps are to be found in such publications as the *Geological Society of China Bulletin*, the *Geological Survey of Hunan Bulletin*, the *Annual Reports*, and *Special Publications*, *Geological Survey of Kwangtung and Kwangsi*, the *Memoirs and Contributions of the National Research Institute of Geology, Academia Sinica*.

### (53) 1 : 50,000, Geological Map of the Nanking Hills

Six sheets published by the National Research Institute of Geology, Academia Sinica.

### (54) 1 : 1,000,000, General Geological Map of China

Only three sheets issued, each covering 6° longitude and 4° latitude (similar to the International Map), published 1924-28 by the Geological Survey of China. Geological detail in colour superimposed on a topographical map, with a full geological and topographical legend. An explanatory booklet accompanies each sheet.

## (55) 1 : 2,000,000, Geological Atlas Eastern-Asia

Published in 1929 by the Tokyo Geographical Society, the whole series comprising seventeen sheets, of which Nos. 6, 7, 10, 11, 14, 15 cover China Proper.

See also *Atlas von China* (No. (81)).

## F. MISCELLANEOUS MAPS OF CHINA

*Maps issued by official and other organizations*

A considerable number of maps and series have been published by various official and other organizations.

The Whangpoo Conservancy Board, in addition to its river charts, published in the period 1918-22 topographic maps of the Shanghai area : (i) 1 : 24,000 Woosung to Lunghwa ; (ii) 1 : 60,000 Whangpoo and surrounding districts (two sheets) ; and (iii) 1 : 240,000 District around and approaches to Shanghai.

The Board of Conservancy Works of Kwangtung has similarly covered important areas in Kwangtung : (i) 1 : 50,000 Swatow delta ; (ii) 1 : 100,000 Lower course of the East River ; and (iii) 1 : 150,000 Canton delta—all published in 1922.

The Chinese Maritime Customs has a 1 : 36,360 sheet of Foochow, Nintai and surrounding country published in 1923.

Further recent maps include :—

## (56) 1 : 50,000, Chihli Province

This series, from surveys carried out between 1919 and 1926 by the Chihli River Commission, has been reproduced by G.S.G.S. Series 3789a (No. (11)).

## (57) 1 : 100,000, Chihli Province

This series, covering part of Chihli province, was published at Peking in 1925 by order of the Ministry of Communications in sixty-six sheets (each  $16\frac{1}{2} \times 11$  in.), based on Chihli River Commission and other Chinese surveys. Graticule every 5 minutes longitude and latitude ; scale in km. and li.

Relief by contours in red at 50 m. intervals, with form-lines on higher ground : water features in blue with submarine contours at 6, 10, and 20 fm. Roads, railways, and minor features in black, towns in black and red. Chinese and some English place-names.

## (58) 1 : 100,000, Chihli Province

This series, covering the district bordering the Peking-Mukden railway, between Peking and Shanhaikwan, is similar to No. (57) and was also published by order of the Ministry of Communications in 1925.

## (59) 1 : 1,300,000, New Kwangtung and Kwangsi Map

Coloured single sheet ( $39\frac{1}{2} \times 26\frac{1}{2}$  in.), published by Jih-Sin Geographical Institute, Shanghai, in 1939. Graticule every  $1^\circ$  longitude and latitude. Scale in km.

Relief by crude brown hachures, spot-heights in black : rivers, lakes and sea in blue. Black symbols for roads, railways, boundaries, towns, etc. ; red symbols for telegraph stations and navigation information. Names in Chinese, some English transliterations. Three insets, one of Hainan on the same scale, are included within the sheet.

(60) 1 : 1,300,000, Hupeh and adjacent provinces

Similar to No. (59), but published in 1938, scale in miles and km., no indication of relief : sheet measures  $18 \times 26\frac{1}{2}$  in.

(61) 1 : 1,676,850, The New Map of China

Published by the Far Eastern Geographical Establishment, Shanghai, in 1916 and 1924 (see also No. (80)), as a single sheet mounted to fold (also in four sheets). Highly coloured political map with English transliterations.

(62) 1 : 2,000,000, Chinese Republic and the Outer Dependencies

Published in 1941 by the Chinese Aeronautical Commission. The series comprises forty-two sheets, each  $15\frac{3}{4} \times 12\frac{3}{4}$  in., covering as far as Korea and Formosa, Lakes Baikal and Balkhash and the Indo-Gangetic Plain. Polyconic projection, graticule every  $1^\circ$  longitude and latitude, margin divided at 10-minute intervals longitude and latitude, scale in miles and km.

Relief by contours at 1,000 m. and every 500 m. upwards, layer-colouring in five shades, some spot-heights in metres. Roads, railways, rivers and towns are shown ; some English transliteration of town names. Map coloured but no details available (photostat copy) ; similar to sheets of New Atlas of China (No. (75)), on which it is based.

(63) 1 : 2,000,000, Map of Interior China

Published by the Economic Bureau of the Chinese Eastern Railway (Dairen, 1927). This large coloured political sheet ( $71\frac{1}{4} \times 64$  in.) has relief by hill-shading and all names in Russian.

(64) 1 : 2,000,000, Postal Map of China

Published by the Directorate-General of Posts (Shanghai, 1921) on the same lines as the Postal Atlas of China (see No. (77)) ; a single sheet,  $54\frac{3}{4} \times 58$  in., with insets of certain areas.

(65) 1 : 6,000,000, New China Map

Compiled and published by the Jih-Sin Geographical Institute. Shanghai, 1938, this single sheet ( $40 \times 27$  in.) shows the provinces and outer dependencies of China Proper in colours. Graticule every  $5^\circ$  longitude and latitude, scale in miles and km.

No representation of relief, rivers blue or black, lakes and sea blue. Numerous black symbols for railways, roads, sea routes, towns, mines, peaks, etc. Provincial names in red, others in black, all in Chinese and English. There are ten insets of selected areas on different scales.

*Maps Issued by Publishing Firms*

Publishing firms were early in the field with maps of China: Justus Perthes in 1835, Stanford in 1887, Bartholomew in 1900. The following are some of the more modern maps and do not include political 'war maps' published since 1939:

## (66) 1 : 3,000,000, Bathyrorographical Map of China (in Chinese)

Compiled by S. Y. Tseng, J. T. Fang and C. T. Chow, printed and published by the *Shun Pao* (Shanghai and Chungking, 1939). This map consists of four sheets each  $34\frac{1}{2} \times 27\frac{1}{2}$  in. Graticule every  $4^\circ$  latitude and longitude, margin divided into  $1^\circ$  intervals latitude and longitude. Conical orthomorphic projection, latitude scale in km.

Relief by layer-colouring in shades of green and brown, with changes of shade at sea level, 200 m., 400 m., 1,000 m., and every 1,000 m. to 6,000 m., land above snow-line left white; occasional spot-heights in black. Rivers by single black lines and double black lines filled blue, lakes in blue, sea in blue layer-colouring with change of shade at 50 m., 200 m., 1,000 m., and by 1,000 m. to 7,000 m.

Roads (two grades), railways (two grades) and sea routes in black. Boundaries black overlaid purple; towns (seven grades), canals, Great Wall, marshes, glaciers, passes, peaks, heads of navigation by black symbols; black stipples for sand and sandbanks. Names of counties and provinces in red, other names black. These sheets cover large areas of outlying border regions and are accompanied by an index volume of sixty-nine pages all in Chinese.

## (67) 1 : 3,000,000, Map of China

This map, published at intervals 1898-1938 by E. Stanford (London) for the China Inland Mission, is on the same lines as the sheets of the Complete Atlas of China (see No. (83)).

## (68) 1 : 3,000,000, Commercial Map of China

Compiled by Sir A. Hosie, published by G. Philip (London, 1922-28) in two sheets. Contains useful economic information; transliteration as for China Postal Atlas (No. (77)), complete index to place-names.

(69) 1 : 5,000,000, *Schauplatz der Chinesischen Revolution*

This map, designed to illustrate the events of the Chinese Revolution of 1911-12, and based on the sheets of *Stieler's Handatlas*, was published by Justus Perthes (Gotha, 1912).

## (70) 1 : 5,000,000, China

Published by J. Bartholomew (Edinburgh, 1944) on the same lines as the following map, No. (71), but extending farther west. This sheet forms the folding map at the end of this handbook.

## (71) 1 : 6,000,000, The Far East

This sheet, published in Edinburgh (no date) by J. Bartholomew (Bartholomew's World Contoured Series), measures  $26\frac{3}{4} \times 28$  in. Graticule every  $2^\circ$  longitude and latitude ; scale in miles and km.

Relief by fine dotted black contour lines at 600 ft., 1,500 ft., 6,000 ft., 12,000 ft., with layer-colouring in shades of green and brown. Railways, rivers and sea routes in black ; lakes and sea in blue, with submarine contour and change of shade at 100 fm. Boundaries red, international boundaries over-laid purple, town symbols in black.

## (72) 1 : 6,000,000, China

This sheet, in the London Atlas Series, was published by E. Stanford (London, 1924).

## (73) 1 : 6,969,000, Map of China and Japan (The Far East)

A single sheet ( $24 \times 37\frac{1}{4}$  in.), published by E. Stanford (London, 1917-38-41). Coloured political map with hachures for mountain ranges.

## (74) 1 : 8,744,000, Standard Map of China and Japan

Published by Rand McNally (Chicago and New York, 1939). This map has been used in several American publications on China.

*Maps in Periodicals, Guide Books and other Publications*

There are a large number of maps of China in various periodicals, especially the *Geographical Journal*, *Petermanns Geographische Mittheilung*, and the *Geographical Review*. Many of these are sketch maps, route maps and district maps illustrating the journeys and researches of explorers, scientists, missionaries and consular officers, among them being Sven Hedin, Sir Aurel Stein, F. Kingdon Ward, Eric Teichman, Bailey Willis, Lt.-Col. E. Wingate, Rev. J. Hedley. Such maps vary greatly and their chief interest lies in providing source material for more general compilations.

Many books and publications on China contain maps some of which are useful ; particularly worth mentioning is *The Christian Occupation of China* (Shanghai, 1922), published by the China Continuation Committee and containing a large variety of excellent maps illustrating the chief topics dealt with in the volume.

Of the guide books which contain maps of China the *Guide to China*, issued by the Japanese Government Railways, and the *Guides Madrolles* series published by Hachette, Paris, may be noted.

## G. ATLASES

## (75) New Atlas of China (in Chinese)

Compiled by V. K. Ting, S. Y. Tseng and W. H. Wong, printed and published by the *Shun Pao*, Shanghai, in 1934.

This atlas is the most comprehensive work of its kind on China and is based on the unique map collection of the Geological Survey of China,

which includes maps of the Chinese General Staff, of river conservancy authorities, of railway companies, of foreign survey authorities and of various scientific expeditions. Since no systematic geodetic surveys of China exist, isolated astronomical observations made by travellers and scientific expeditions have been largely used, but these have been supplemented by numerous positions determined by members of the Geological Survey.

The atlas consists of fifty-two plates, each  $16 \times 11\frac{1}{2}$  in. in size. The relief maps have contours at 200 m., 400 m., 1,000 m., and by 500 m. to 5,500 m., with layer-colouring in shades of green and brown, spot-heights in black, in metres, water features in blue with submarine contours and change of shade at 20 m. and 40 m. There are also maps of the climate, agriculture, mineral resources, distribution of language, political divisions and communications, in a wide range of colours. The political and relief maps covering the whole country are on a scale of 1 : 2,000,000, excepting those for Turkestan, Tibet and Mongolia, which are on a scale of 1 : 5,000,000. There are two plates with plans of the most important cities and ports, and an index giving the geographical co-ordinates of all the most important cities, towns, mountain peaks, etc.

#### (76) New Maps of the Provinces of China (in Chinese)

Compiled by V. K. Ting, S. Y. Tseng, and W. H. Wong, printed and published by the *Shun Pao* of Shanghai in 1933 (revised editions 1936, 1940).

This is a small edition of the New Atlas of China (No. (75)), and on the same lines, comprising fifty-seven plates, each  $11 \times 8\frac{1}{2}$  in. in size.

#### (77) China Postal Atlas

This was first issued in 1907 as the 'China Postal Album, showing the Post Offices and Postal Routes in each Province'. It was published by the Statistical Department of the Inspectorate-General of Customs, Shanghai, and included twenty coloured plates, each  $18\frac{1}{2} \times 12\frac{1}{2}$  in. in size, together with a list of postal officials and telegraph offices, but without an index.

A second edition was published at Peking in 1919 by order of the Directorate-General of Posts, and was called the 'China Postal Atlas, showing the Postal Establishments and Postal Routes in each Province'. It had forty-seven coloured plates,  $24\frac{1}{2} \times 15$  in. in size, in various scales, with an explanation of conventional signs in Chinese, French and English. The names on the plates were in Chinese and English, as was the index, while distances were given in Chinese li. The sheets of this atlas were published separately at intervals between 1921 and 1929 (see No. (64)).

The third edition, published in 1933 at Nanking by the Directorate-General of Posts, was similar to the above, but had only thirty plates, with insets of important areas. The index, however, was in Chinese only, which made the atlas of less value than the previous one.

#### (78) Historical and Commercial Atlas of China

Printed in Berlin, and published at Cambridge, Mass., by the Harvard University Press in 1935. This atlas, compiled by A. Hermann, has eighty pages of coloured maps on various small scales, mainly of a historical nature.



Also included are some political, physical and economic maps, with numerous plans of important towns and districts. The whole work is in English, and has a selected bibliography, a list of Chinese characters and a full index.

### (79) Land Utilization in China Atlas

Printed in Shanghai, and published at Nanking by the University of Nanking, 1937. This atlas shows in cartographic form the results of a detailed and comprehensive survey of land utilization in China, carried out under the direction of J. L. Buck.

There are 130 pages with 184 black and white maps, on scales of 1 : 10,000,000 or less, illustrating the topography, climate, vegetation, soils, crops, livestock, nutrition and various other details of Chinese agriculture. The maps are accompanied by detailed explanations, English and Chinese being used throughout. The atlas ends with thirteen aerial photographs of land utilization in typical areas.

### (80) The New Atlas and Commercial Gazetteer of China

Published and printed at Shanghai, 1918, and edited by E. J. Dingle for the Far Eastern Geographical Establishment. This atlas has twenty-nine maps,  $22 \times 16\frac{1}{2}$  in., of the provinces and outer territories of China on a scale of 1 : 1,676,850.

No representation of relief. Names in Chinese and English with a full index. There are maps of economic products, distribution of forests, and railways (in 1917). The gazetteer, comprising about 300 pages of letterpress, deals with foreign trade, ports, forests and railway system. There are regional surveys, uneven in character, but of most value when dealing with agriculture and with trading centres. The sheets of this atlas were also published singly (see No. (61)).

### (81) *Atlas von China*

Compiled by F. von Richtofen, the German geologist. This work was published at Berlin in three sections—the first two in 1885 (twenty-six sheets, covering North China), the last in 1912 (twenty-eight sheets, covering South China). The sheets are on a scale of 1 : 750,000 and generally measure  $16\frac{1}{2} \times 13\frac{1}{4}$  in. (some are larger). The sheets with odd numbers show the physical and human features of the area.

Relief by brown hill-shading, with light green tinting for plains and black spot-heights. Rivers, roads, railways, towns, etc., are in black, and sea in blue, with 50 m. and 100 m. submarine contours in black. The sheets with even numbers show the geological detail of the corresponding areas on the opposite pages in full colour, but there are numerous uncoloured spaces where data was not available. The maps are preceded by a letterpress introduction in German. This well-produced atlas was for long the best work of its kind on China.

### (82) *Atlas de Macau*

Published by the *Ministerio das Colonias Commissão de Cartographia* at Lisbon in 1912. Five sheets, each  $11\frac{3}{4} \times 17\frac{1}{4}$  in. There is one general map on a scale of 1 : 80,000, with Portuguese territory coloured red. Graticule every 2 minutes latitude and longitude, margin divided into 1-minute intervals. Scale in km.

Relief by black hachures, with some spot-heights in metres. Swamps, sand and settlements in black, sea in blue-green. There is also a plan of Macau city, and a chart of Macau roadstead, with soundings and sea contours at 1 and 4 m. Maps of two outlying islands, Taipa (relief by black hachures) and Colone (relief by black contour lines at 10 m. intervals), complete the atlas.

### (83) Complete Atlas of China

This atlas, published by Stanford (second edition, London, 1917) for the China Inland Mission, contains a key map, eighteen maps of the provinces on a scale of 1 : 3,000,000, and four maps of the Outer Dependencies (Manchuria, Mongolia, Sinkiang, Tibet) on a scale of 1 : 7,500,000 ; some single-page, some double-page. First edition published in 1908.

No representation of relief. Railways, roads, canals, telegraph stations and marshes in black ; lakes, sea and lower river courses in blue. Mission stations by red symbols, towns (six grades) in red and black. In each case the area outside the province shown is shaded green (see also No. (67)).

# CONVERSION TABLES

## METRIC AND BRITISH UNITS

It is customary to think of the 'metre' and the 'yard' as representing unalterable units of length. This is not so. The metre was originally intended to be the 10,000,000th part of the earth's meridional quadrant. But the accurate determination of this length proved to be extremely difficult—partly for technical reasons, and partly because of different conceptions of the 'figure of the earth'. In view of these difficulties it became necessary to define the length of the metre in terms of suitable metal bars measured under specified conditions of temperature, pressure, humidity, etc. Similar standard bars were also used to define the length of other units such as the yard. As all these metallic standards are subject to change, conversion tables differ according to the date of comparison between different bars. The tables that follow are based on the comparison between the yard and the metre made in 1895. This made 1 metre equivalent to 39·370113 in.

### *Metric System. List of Prefixes*

Deca means ten times.	Deci means a tenth part of.
Hecto means a hundred times.	Centi means a hundredth part of.
Kilo means a thousand times.	Milli means a thousandth part of.
In abbreviations the Decametre, etc., is Dm., and the decimetre, etc., dm.	

### *Note on 'Nautical', 'Geographical' and 'Statute' miles*

A British 'nautical mile' is the length of the minute of the meridian at any given latitude, and is therefore a variable unit. It is given in feet for Clarke's 1880 spheroid by the formula

$$60771\cdot1 - 30\cdot7 \cos 2 \text{ Lat.}$$

This is the sea mile of the scale of latitude and distance of the Admiralty Charts. From the above formula it will be found to vary from 6,046·4 ft. at the equator to 6,107·8 ft. at the poles, being 6,077·1 ft. at latitude 45°.

The so-called 'international nautical mile' of 1,852 m. or 6,076 ft. is the length of the minute of the meridian at latitude 45° on the international spheroid. This corresponds to the 6,077 ft. for Clarke's spheroid.

A 'geographical mile' is a fixed unit, being defined by some as the length of a minute of the equator and by others as that of the minute of the meridian at latitude 45°. According to the former definition its value on Clarke's spheroid is 6,087 ft. and according to the latter 6,077 ft. The round figure 6,080 is usually adopted for the purposes of ordinary navigation.

The British 'statute mile' measures 5,280 ft.

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Table 1. *Length*

Nautical mile	Statute mile	Kilometre	Metre	Yard	Foot	Inch	Centimetre
1	1.152	1.853	1853	2027	6080*	72.960	185.300
0.8684	1	1.60934	1609.34	1760	5280	63.360	160.934
0.5396	0.621372	1	1000	1093.61	3280.84	39.3701	100.000
0.0005396	0.0006214	0.001	1	1.09361	3.28084	39.3701	100
0.0004934	0.0005682	0.0009144	0.914399	1	3	36	91.4399
0.0001645	0.0001894	0.0003048	0.3048	0.33333	1	12	30.48
0.0000137	0.0000158	0.0000254	0.0254	0.02778	0.083333	1	2.54
0.0000054	0.0000062	0.00001	0.01	0.0109361	0.032808	0.393701	1

\* This is the customary British practice, and not the 'international nautical mile', which Great Britain has not adopted.

Table 2. *Area*

Square mile	Square kilometre	Hectare	Acre	Square metre	Square yard
1	2.58998	258.998	640	2,589,980	3,097,600
0.386103	1	100	247.106	1,000,000	1,195,990
0.003861	0.01	1	2.47106	10,000	11,959.9
0.0015625	0.0040469	0.404685	1	4046.85	4840
0.0000039	0.000001	0.0001	0.000247	1	1.19599
0.0000032	0.00000084	0.0000836	0.000207	0.836126	1

Table 3. *Yield per Unit Area*

Tons per acre	Metric tons per hectare	Quintals per hectare
1	2.51071	25.1071
0.398294	1	10
0.0398294	0.1	1

Table 4. *Volume and Capacity*

Kilolitre	Cubic metre	Cubic yard	Bushel	Cubic feet	Imp. gall.	Litre	Pint
1	1.000027	1.30799	27.4969	35.3157	219.976	1000	1759.80
0.999973	1	1.30795	27.4902	35.3148	219.970	999.973	1759.75
0.764532	0.764553	1	21.0223	27	168.178	764.532	1345.43
0.0363677	0.0363687	0.0475685	1	1.28435	8	36.3677	64
0.028316	0.028317	0.037037	0.778602	1	6.22882	28.3160	49.8306
0.0045460	0.0045608	0.0059461	0.125	0.160544	1	4.54596	8
0.001	0.001000	0.001308	0.027497	0.035316	0.219976	1	1.75980
0.0005682	0.0005683	0.0007433	0.015625	0.020068	0.125	0.56824	1

Table 5. *Weight*

Ton	Metric ton or millier	Quintal	Kilogram	Pound
1	1.01605	10.1605	1016.05	2240
0.984207	1	10	1000	2204.62
0.0984207	0.1	1	100	220.462
0.0009842	0.001	0.01	1	2.20462
0.0004464	0.0004536	0.004536	0.453592	1

Table 6. Temperature : Equivalents of Fahrenheit and Centigrade Scales

°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.	°F.	°C.
100	37.7	79.25	26.25	58	14.4	37.4	3	17	8.3	—	4	—	—20
99.5	37.5	79	26.1	57.2	14	37	2.7	16.25	8.75	—	5	—	—20.5
99	37.2	78.8	26	57	13.8	36.5	2.5	16	8.8	—	5.8	—	—21
98.6	37	78	25.5	56.75	13.75	36	2.2	15.8	9	—	6	—	—21.1
98	36.6	77	25	56	13.3	35.6	2	15	9.4	—	6.25	—	—21.25
97.25	36.25	76	24.4	55.4	13	35	1.6	14	10	—	7	—	—21.6
97	36.1	75.2	24	55	12.7	34.25	1.25	13	10.5	—	7.6	—	—22
96.8	36	75	23.8	54.5	12.5	34	1.1	12.2	11.1	—	8	—	—22.2
96	35.5	74.75	23.75	54	12.2	33.8	1	12	11.1	—	8.5	—	—22.5
95	35	74	23.3	53.6	12	33	0.5	11.75	11.25	—	9	—	—22.7
94	34.4	73.4	23	53	11.6	32	0	11	11.6	—	9.4	—	—23
93.2	34	73	22.7	52.25	11.25	31	—0.5	10.4	12	—	10	—	—23.3
93	33.8	72.5	22.5	52	11.1	30.2	—1	10	12.2	—	10.75	—	—23.75
92.75	33.75	72	22.2	51.8	11	30	—1.1	9.5	12.5	—	11	—	—23.8
92	33.3	71.6	22	51	10.5	29.75	—1.25	9	12.7	—	11.2	—	—24
91.4	33	71	21.6	50	10	29	—1.6	8.6	13	—	12	—	—24.4
91	32.7	70.25	21.25	49	9.4	28.4	—2	8	13.3	—	13	—	—25
90.5	32.5	70	21.1	48.2	9	28	—2.2	7.25	13.75	—	14	—	—25.5
90	32.2	69.8	21	48	8.8	27.5	—2.5	7	13.8	—	14.8	—	—26
89.6	32	69	20.5	47.75	8.75	27	—2.7	6.8	14	—	15	—	—26.1
89	31.6	68	20	47	8.3	26.6	—3	6	14.4	—	15.25	—	—26.25
88.25	31.25	67	19.4	46.4	8	26	—3.3	5	15	—	16	—	—26.6
88	31.1	66.2	19	46	7.7	25.25	—3.75	4	15.5	—	16.6	—	—27
87.8	31	66	18.8	45.5	7.5	25	—4	3.2	16	—	17	—	—27.2
87	30.5	65.75	18.75	45	7.2	24.8	—4.4	3	16.1	—	17.5	—	—27.5
86	30	65	18.3	44.6	7	24	—5	2.75	16.25	—	18	—	—27.7
85	29.4	64.4	18	44	6.6	23	—5.5	2	16.6	—	18.4	—	—28
84.2	29	64	17.7	43.25	6.25	22	—6	1.4	17	—	19	—	—28.3
84	28.8	63.5	17.5	43	6.1	21.2	—6.1	1	17.2	—	19.75	—	—28.75
83.75	28.75	63	17.2	42.8	6	21	—6.25	0.5	17.5	—	20	—	—28.8
83	28.3	62.6	17	42	5.5	20.75	—6.6	0	17.7	—	20.2	—	—29
82.4	28	62	16.6	41	5	20	—7	—	18	—	21	—	—29.4
82	27.7	61.25	16.25	40	4.4	19.4	—7.2	—	18.3	—	22	—	—30
81.5	27.5	61	16.1	39.2	4	19	—7.5	—	18.75	—	23	—	—30.5
81	27.2	60.8	16	39	3.8	18.5	—7.7	—	19	—	23.8	—	—31
80.6	27	60	15.5	38.75	3.75	18	—8	—	19.4	—	24	—	—31.1
80	26.6	59	15	38	3.3	17.6	—8	—	—	—	24.25	—	—31.25

Table 7.

*Pressure : Equivalents of Millibars, Millimetres of Mercury, and Inches of Mercury at 32° F. in Latitude 45°*

Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.	Mercury in.	Milli- bars	Mercury mm.
27.02	915	686.3	27.82	942	706.6	28.62	969	726.8	29.41	996	747.1
27.05	916	687.1	27.85	943	707.3	28.65	970	727.6	29.44	997	747.8
27.08	917	687.8	27.88	944	708.1	28.67	971	728.3	29.47	998	748.6
27.11	918	688.6	27.91	945	708.8	28.70	972	729.1	29.50	999	749.3
27.14	919	689.3	27.94	946	709.6	28.73	973	729.8	29.53	1,000	750.1
27.17	920	690.1	27.97	947	710.3	28.76	974	730.6	29.56	1,001	750.8
27.20	921	690.8	28.00	948	711.1	28.79	975	731.3	29.59	1,002	751.6
27.23	922	691.6	28.03	949	711.8	28.82	976	732.1	29.62	1,003	752.3
27.26	923	692.3	28.05	950	712.6	28.85	977	732.8	29.65	1,004	753.1
27.29	924	693.1	28.08	951	713.3	28.88	978	733.6	29.68	1,005	753.8
27.32	925	693.8	28.11	952	714.1	28.91	979	734.3	29.71	1,006	754.6
27.35	926	694.6	28.14	953	714.8	28.94	980	735.1	29.74	1,007	755.3
27.38	927	695.3	28.17	954	715.6	28.97	981	735.8	29.77	1,008	756.1
27.41	928	696.1	28.20	955	716.3	29.00	982	736.6	29.80	1,009	756.8
27.44	929	696.8	28.23	956	717.1	29.03	983	737.3	29.83	1,010	757.6
27.47	930	697.6	28.26	957	717.8	29.06	984	738.1	29.86	1,011	758.3
27.49	931	698.3	28.29	958	718.6	29.09	985	738.8	29.89	1,012	759.1
27.52	932	699.1	28.32	959	719.3	29.12	986	739.6	29.92	1,013	759.8
27.55	933	699.8	28.35	960	720.1	29.15	987	740.3	29.94	1,014	760.6
27.58	934	700.6	28.38	961	720.8	29.18	988	741.1	29.97	1,015	761.3
27.61	935	701.3	28.41	962	721.6	29.21	989	741.8	30.00	1,016	762.1
27.64	936	702.1	28.44	963	722.3	29.24	990	742.6	30.03	1,017	762.8
27.67	937	702.8	28.47	964	723.1	29.26	991	743.3	30.06	1,018	763.6
27.70	938	703.6	28.50	965	723.8	29.29	992	744.1	30.09	1,019	764.3
27.73	939	704.3	28.53	966	724.6	29.32	993	744.8	30.12	1,020	765.1
27.76	940	705.1	28.56	967	725.3	29.35	994	745.6	30.15	1,021	765.8
27.79	941	705.8	28.59	968	726.1	29.38	995	746.3	30.18	1,022	766.6

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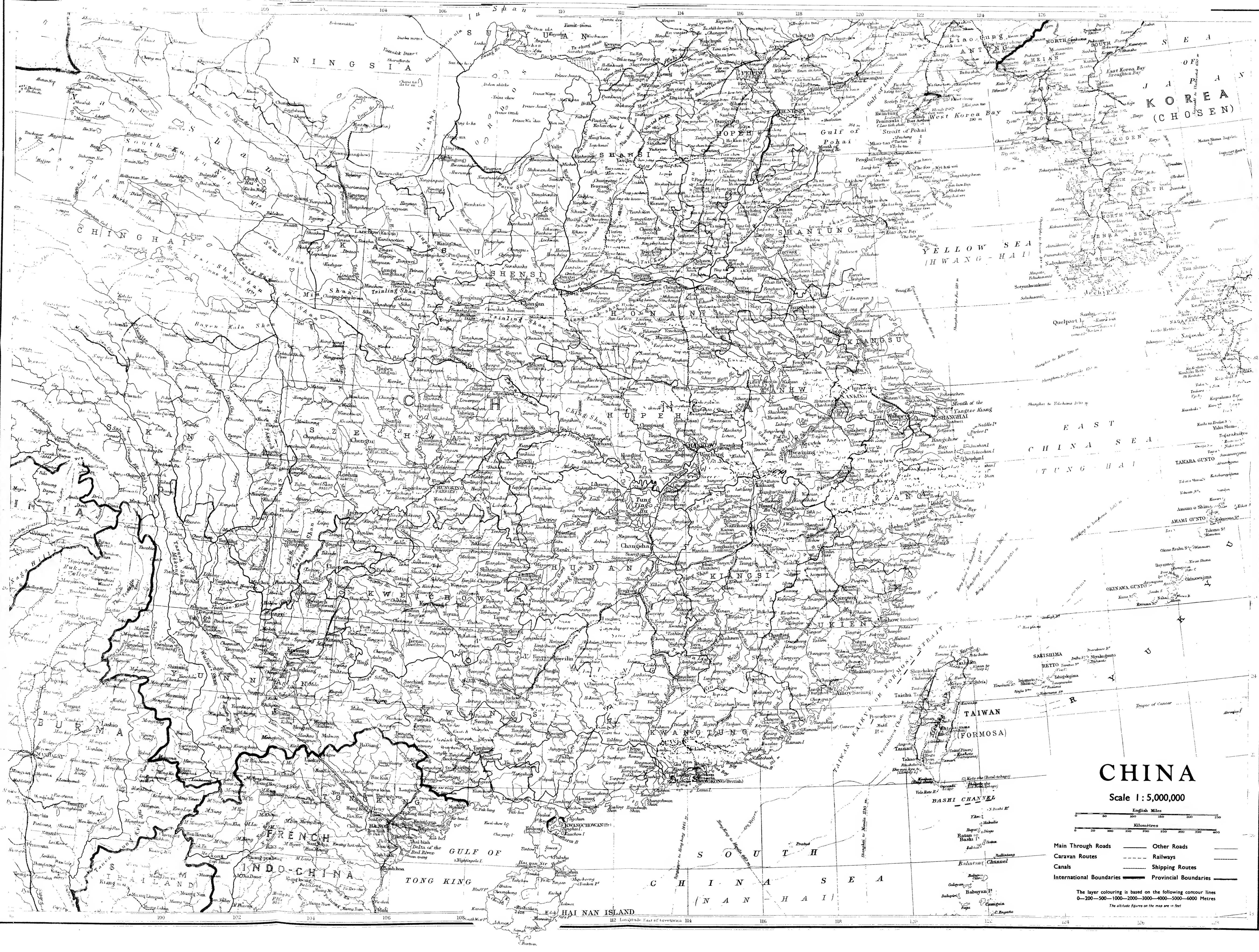
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